

Final Report:
Finding Ways to Reduce
Insurance and Bonding
Costs for Major Transit
Projects

FDOT Contract #: BD549-18

September, 2006

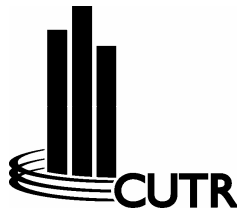
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September 2006

Technical Report Documentation Page

1. Report No. n/a		2. Government Accession No.		3. Recipient's Catalog No.	
4. Title and Subtitle Finding Ways to Reduce Insurance and Bonding Costs for Major Transit Projects: Final Report				5. Report Date September 2006	
				6. Performing Organization Code	
7. Author(s) Stephen L. Reich, Janet L. Davis, and Julia Cope				8. Performing Organization Report No. NCTR 77602-00	
9. Performing Organization Name and Address Center for Urban Transportation Research 4202 E. Fowler Ave. CUT100 Tampa, FL 33620				10. Work Unit No. (TRAVIS)	
				11. Contract or Grant No. BD549-18	
12. Sponsoring Agency Name and Address Florida Department of Transportation 605 Suwannee St., MS 30 Tallahassee, FL 32399				13. Type of Report and Period Covered Final Report, December 2005- September 2006	
				14. Sponsoring Agency Code	
15. Supplementary Notes Project Manager: Ike Ubaka					
16. Abstract <p>The Florida Department of Transportation (FDOT) asked the National Center for Transit Research (NCTR) at the University of South Florida to investigate the reasons behind the rising costs in insurance and bonding for transit projects and identify ways that transit agencies can minimize these costs in their major capital programs. Four distinct tasks are included in this research project: Task I Comprehensive literature review; Task II Communication with the Federal Transit Administration (FTA) for assistance in the identification of transit agencies that have worked closely with the issues associated with the research project and with FDOT to help ensure that FDOT's concerns are addressed; Task III Secure stakeholders' perspectives to gain insight into and garner information about the dynamics of costs associated with bonding and insurance and to determine the need for conducting a roundtable discussion to further explore and identify issues, to achieve greater understanding of the issues and to identify potential solutions. If there is sufficient support for a roundtable discussion then organize and conduct the event and; Task IV Final Report.</p> <p>In support of the results achieved in various stages of the research project and in response to requests by the FDOT Project Manager, Technical Memorandums were submitted in February 2006 and in June 2006 and a July/August 2006 Progress Report was completed and submitted as requested. The results of the research project's tasks, the findings and the recommendations based upon the findings are the subjects of this Draft Final Report.</p>					
17. Key Word Insurance and Bonding, Transit Capital Projects			18. Distribution Statement No restrictions.		
19. Security Classif. (of this report) unclassified		20. Security Classif. (of this page) unclassified		21. No. of Pages 98	22. Price

EXECUTIVE SUMMARY

The Florida Department of Transportation (FDOT) asked the National Center for Transit Research (NCTR) at the University of South Florida to investigate the reasons behind the rising costs in insurance and bonding for major transit construction projects and identify ways that transit agencies could minimize these costs in their major capital programs. Researchers defined major transit capital projects as those projects primarily involving rail, bus rapid transit systems or projects of similar complexity and/or cost.

Florida is positioned to embark on a number of major transit construction projects over the next five years. As transit's primary funding source for capital programs, the Federal Transit Administration (FTA) expressed concern about escalating construction costs, specifically in the areas of insurance and bonding.

Researchers were required not only to test the premise that costs for insurance and bonding were increasing but also to identify the basis of the increase, if the premise was confirmed. Researchers attempted to determine whether the costs associated with insurance and bonding for major transit construction projects were increasing disproportionately to overall construction costs.

A thorough review of available literature on the subject was conducted to identify articles written on the subject in the areas of insurance and bonding expenses associated with major transit construction projects. In order to provide a comprehensive understanding of the issues, the literature review included research related to why transit agencies need to seek alternative avenues of funding and an overview of some of the long-term and short-term approaches to debt financing, eight case studies that illustrated the rising costs associated with major capital construction projects, the identified drivers behind the rising costs, and possible ways to reduce costs.

To ensure adequate representation of Florida-based transit agencies, five Florida agencies and the Miami International Airport (due to a large portfolio of capital intensive construction projects) were included in the target participant roster. A *Leadership APTA* listserv request was generated to promote the interest of transit agencies nationwide to participate in the research project.

An interview tool was developed to assist researchers in the survey task, and researchers gained perspectives and garnered information through direct contacts with those who had a vested interest in major capital transit construction, including transit agency representatives, insurance and bonding associations and other stakeholders from private and professional transportation-related organizations. Only 21 of the 34 identified stakeholders participated in the in-depth interviews.

If sufficient interest was found, researchers were to organize a roundtable discussion. The need for and benefits of having a roundtable discussion to strengthen the interview findings and verify further the implications of the literature review were weighed. One of the primary goals of conducting a roundtable was to promote dialogue between a diverse mix of those with a vested interest in major transit construction projects. While steps to organize a roundtable were initiated, insufficient stakeholder interest across the sectors along with severe scheduling restraints nullified the researchers' capacity to conduct a meaningful roundtable discussion.

In general, researchers found that although there have been increases in the cost of risk insurances associated with major capital construction projects, the primary drivers in the escalation of overall increases in costs associated with major capital construction projects were related to: labor, concrete, steel, fuel, real estate acquisition, bid and construction delays, as well as other factors not associated with risk insurance.

Following is a summary of recommended actions to assist transit agencies in minimizing insurance costs:

Currently, the ***Terrorism Risk Insurance Act*** of 2005 (TRIA) is mandated to sunset on December 31, 2007. Given the ongoing threats of terrorist attacks, it is important for transit agencies to understand how the determination of TRIA could affect them and how they should begin to prepare for such a decision. ***Recommendation:*** provide agencies with status reports focused on developments related to the sunset of TRIA. In the event the forecast for upholding the current legislation is favorable, begin to identify options available to transit agencies for the continuation of affordable terrorism insurance coverage with assistance from the appropriate organizations (including the risk insurance industry). Findings must be communicated to agencies well before the projected sunset date.

Although Florida transit agencies did not perceive that increases in the costs related to bonding and insurance for major transit construction projects were driving the overall increases, the state is experiencing critical problems related to the ***cost and availability of commercial property and liability insurances***. Increases in costs and the lack of industry capacity to write new policies are challenges to transit agencies. ***Recommendations:*** assist transit agencies in exploring options for reducing costs through the evaluation and assessment of benefits and challenges associated with pooling agencies in an effort to reduce premiums; establish criteria for participation in transit insurance pools that would help lead to the establishment and sustainability of functional transit insurance pools; and provide other needed assistance leading to the implementation and ongoing effective management of Florida-based transit insurance pools.

The release of ***bids with cost estimates that are based on estimates projected at the time of bid preparation rather than on present-day cost estimates*** coupled with bid inflation due to anticipated time lost in the bureaucratic bid process were identified as problems associated with working with the public sector on major construction projects. ***Recommendation:*** create a partnership between FDOT and Florida-based agencies to isolate specific problems and identify better mechanisms for releasing bids that incorporate current cost estimates based on present-day projections. Consider using roundtable discussions involving participants from the public and private sectors to establish rapport and identify ways to reduce frustration and bureaucratic-based challenges, as well as to identify private sector misconceptions and private sector induced challenges and frustrations.

Several respondents commented on the difficulty of meeting the ***FTA requirement to have 100 percent of bonding in place prior to project implementation***, which is especially challenging when developing and implementing major capital intensive construction projects. ***Recommendation:*** survey transit agencies to determine the extent of this problem and the mechanisms previously employed to circumvent this challenge. Investigate the rationale behind the FTA requirement and explore bonding requirements for non-transit capital intensive construction projects. Identify reasonable and viable suggestions for revision to current FTA requirements through transit organizations and with assistance from and support of the surety industry.

Although the findings of the research indicated that the increases in the costs related to insurance and bonding for major transit construction project were proportionate to the overall increases in the costs of these projects, there was recognition that ***increases associated with risk insurance impact the bottom line***. To achieve a better understanding of the trends related to costs and the challenges of finding insurance companies willing to cover new projects, at least

five respondents suggested separating the issues of bonding and insurance. The respondents suggested not only evaluating them independently from each other but also evaluating them independently as cost drivers to escalating costs of major capital construction projects. **Recommendation:** develop and conduct independent research projects geared to each component of the risk insurance industry involved with major transit construction projects. Obtain feedback from transit agencies, risk industry representatives and others with vested interest in major capital construction projects for suggestions related to the design, objectives and scope of the projects. With assistance from FTA and FDOT, identify several transit agencies willing to participate in the research projects by tracking costs related to insurance and bonding. Since projects are generally several years in duration, initial findings could be developed with ongoing submissions, updated and tracked as projects progress.

The Dulles Metro Project is the largest transportation project the Commonwealth of Virginia has ever undertaken and the third most costly rail proposal in the country. The project utilizes a **competitive/negotiated process**, which differs from the standard design-built bid. If costs run higher than anticipated during the project, the state and the private sector company share the risk. In order to accommodate funding cycles and insurance requirements, the project has been segmented into two phases. It is the Commonwealth's first experience of constructing a non-road project under the state's Public/Private Transportation Act. **Recommendation:** ongoing communication and status reports related to Dulles Metro Project could provide other agencies with real-time experiences of one of the largest transit construction projects to be undertaken in the country. At a time when there is considerable concern about revenue streams for transit construction, the promotion of the private sector investment in transit projects provides an additional alternative. The use of a shared risk approach between the public and private sectors could help other agencies determine if true cost savings could be gained using a similar approach.

Consideration of ***how to reduce costs in creative and innovative ways*** is critical given the decrease in federal funding for transit construction; competition of other public-serving departments for state and local funds; the need to comply with several federal programs that require additional expenditures; costly maintenance of existing transit systems; and replacement of rolling stock. ***Recommendation:*** joining forces with a university-based transportation research facility that can bring the resources of a business school, an engineering school and their own economic analysis and evaluation skills to the table could help FDOT and/or FTA in the identification and design of creative but viable approaches to cost reductions. The collaborative effort could explore known cost reduction methods, such as indexing bids to be agreed upon, clearly established values for labor and/or materials and set-points that determine who pays for what and when. Exploration of such methods could lead to variations of the indexing model, the development of new models to reduce specific costs, or a combination of costs related to major construction projects.

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INTRODUCTION

To meet the nation's transportation needs, many states and localities are planning or building expensive mass transit projects to replace aging infrastructure or to build new capacity. These transit projects present major challenges to state and local transportation officials. The projects can be technically challenging to construct and require their sponsors to resolve a wide range of social, environmental, land-use, and economic issues before and during construction. They are costly and require significant commitments of public resources, which may take several years to obtain from federal, state, and local sources.

The federal government provides funds to states and cities for capital improvements for highway and transit systems, while the states and cities cover most of the costs associated with operating the highway and transit systems. Over the past 10 years, the federal share of annual capital investment by all levels of government in highways has averaged 42 percent. Total capital funding for transit has increased from the period prior to the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) through the end of the 20th century (see Figure 1 and Figure 2 for details). Between 1990 and 2000, total capital funding for transit increased nearly 95 percent, from \$4.9 billion in 1990 to \$9.6 billion in 2000.

According to information available from the Federal Transit Administration (FTA) and the American Association of Public Transportation (APTA), directly generated funds (funds generated by transit operations, including directly levied taxes and tolls) were responsible for a significant portion of this increase with their value increasing from \$200 million in 1990 to \$2.6 billion in 2000. In 1990, the federal government provided \$2.9 billion in capital assistance, nearly 60 percent of the total. By 2000, this figure increased by 57 percent to \$4.5 billion,

representing only 47 percent of total capital funding. State assistance for transit rose from nearly \$0.7 billion in 1990 to \$1.0 billion by 2000, an increase of 48 percent.

Local assistance (not including directly generated funds) rose modestly until 2000. The composition of capital funding varies across transit systems in relation to the size of the system. Measured by population, smaller systems depend more heavily on federal and state financial support, while larger system are able to generate a greater percentage of their capital funding from system operations or directly-generated taxes.

Table 1-1 Funding by Source for Capital Transit Investments for the Decade 1990-2000

Funding Source	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Percent Change (1990-2000)
Federal	\$2.9	\$2.8	\$2.7	\$2.4	\$2.6	\$3.4	\$3.6	\$4.3	\$3.9	\$4.0	\$4.5	57%
State	0.7	0.7	0.8	1.3	1.0	1.0	0.9	1.0	0.9	0.9	1.0	48%
Local	1.2	1.0	0.8	1.1	1.0	0.9	0.9	0.9	1.0	1.1	1.5	25%
Directly Generated	0.2	1.1	1.1	1.0	1.2	1.9	1.6	1.6	2.0	3.0	2.6	1253%
Total	\$4.9	\$5.6	\$5.4	\$5.8	\$5.8	\$7.2	\$7.1	\$7.8	\$7.9	\$9.0	\$9.6	94%

Funding by Source - 2000

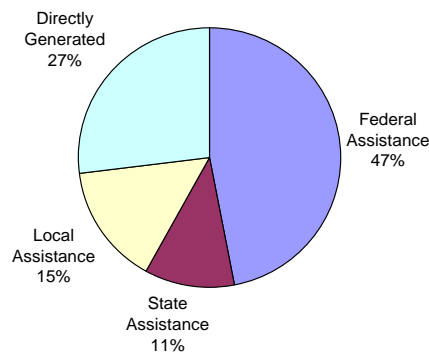


Figure 1-1 Percentage Breakdown of Capital Transit Investment by Funding Agencies for Year 2000

Why Do Transit Agencies Have to Look for Alternative Means of Funding?

Despite the significant increase in federal and state funding for transit capital projects, transit agencies face a significant gap between needed investments and available resources.

- Existing systems are in need of major repair and replacement of existing rolling stock and other assets. Rapidly growing communities need to expand services and bring new services online. These activities require additional funding.
- In addition, compliance with several federal programs requires additional expenditures. Compliance with Americans with Disabilities Act (ADA) requires rolling stock and station upgrades to accommodate customers with disabilities, and the Clean Air Act Amendments of 1990 and the Energy Policy Act of 1992 require agencies to replace existing fleets with less polluting vehicles.
- Federal grants for new projects termed “New Starts” are shrinking as a percentage of total capital. Typically, the government provides 80 percent of total capital funding required for selected projects. With a move to reduce this to 50 percent, transit agencies have a need to look for alternative funding sources.
- Ever increasing costs of raw materials, labor and design mean that the costs will only continue to escalate.
- Fare box recovery has remained at 40 percent, and offers limited potential for increase, which requires transit agencies to look for other revenue sources to support themselves.
- In an increasingly competitive market, where transit is forced to compete with other public-serving departments, such as health and education for a share of grants, resources are scarce.

Transit agencies need to look to other sources of revenue in order to remain competitive and offer reasonable service to the customers. Utilizing private partners (Public Private Partnership) to raise funds has been mooted as a possible solution with floating bonds to raise money for projects being the most common option in recent times.

Although transit agencies of all sizes have participated in the capital markets, a small number of major transit agencies are responsible for the vast majority of transit-related debt financing today. In contrast to the “major players,” i.e., the new Light Rail (LRT) systems, most transit agencies, particularly bus-only systems, have depended primarily on federal and state grants and lease funding arrangements for their capital programs. Figure 3 presents a summary of mass transportation bond issues from 1997 through 2001.

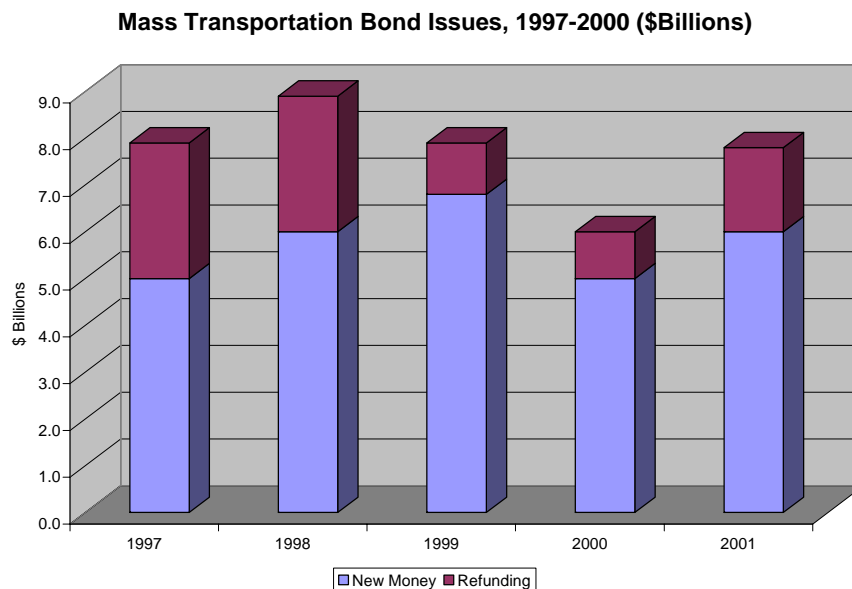


Figure 1-2 Mass Transportation Bond Issues, 1997-2001

The next section deals with bonds that are commonly used by transit agencies to fund their projects.

BOND FINANCING

Bonds are debt mechanisms backed by:

- Dedicated local and state revenues, i.e., sales taxes;
- General obligation pledges of taxing power;
- Pledges of federal and other grant funds; or,
- System revenues (e.g., fare box and ancillary revenues).

Bonds can be used as finance mechanisms to support long-term and short-term infrastructure projects. In order to be truly effective at meeting ongoing transportation needs, funding measures should provide funding not only for the initial construction of the facility, but also for its long-term maintenance and continued operation. While this may seem obvious, states and regions are often tempted to raise short-term capital for the construction of infrastructure projects without consideration of the long-term operations and maintenance costs. New Mexico, for example, has been forced to divert federal and state funds away from its maintenance program to pay the debt service incurred during its recent road-building program (*Evaluating Local Transportation Funding Measures*). Care must be taken to choose a good debt scheme for improving transit. While the process of selecting a viable bond mechanism is beyond the scope of this review, a detailed analysis of different debt schemes available to transit agencies is outlined through the following series of the steps involved in the process.

The following 12 steps (while presented in sequential order, these activities actually occur concurrently with some important feedback loops throughout the process) constitute the development and the implementation of a debt-financing mechanism:

1. Select revenues to pledge for debt service
2. Choose the type of debt to issue

3. Secure the necessary authorizations and approvals
4. Decide upon the use of financial advisors
5. Choose the form of the issue – whether competitive or negotiated
6. Choose the type of security to issue
7. Select the finance team
8. Prepare the financing documents
9. Develop a rating strategy and decide whether to use a credit enhancement vehicle
10. Pre-market the bonds
11. Price the bonds
12. Close the transaction

While this is the natural order of selecting a debt mechanism, the crucial steps are the earliest ones as they initialize funding and debt repayment mechanisms.

Transit capital projects may require financing either for a long term or for relatively short periods. Based on the duration, bond financing can be used to attain different goals.

- Long-term debt financing allows transit agencies to develop projects faster than under a pay-as-you-go (PAYGO) approach (*Pay-as-you-go funding requires governments to pay for infrastructure costs directly from current revenues. Revenue sources commonly used include taxes, fees, user charges, grants, and interest earnings.*) by improving short-term cash flow and matching project funding with the useful life of assets. Faster project delivery can, in some instances, strengthen revenue generation through increased ridership and reduce maintenance costs by retiring older, less reliable equipment.
- Short-term debt-financing mechanisms are available to transit agencies to bridge a gap between a desired acquisition or construction start date and

the availability of permanent financing or grant and other pay-as-you-go funding sources.

Long Term Bonds

There are currently three types of bonds used to varying degrees by transit agencies. Listed in their general order of prevalence in financing transit capital investments, the bond types are as follows:

- Limited recourse bonds backed by dedicated or appropriated revenues other than those resulting directly from system operations, including state or local dedicated sales taxes, motor fuel taxes, property taxes, and pledges of future federal or other grant funds;
- Bonds supported by a general promissory pledge of system revenues (e.g., fare box revenues, advertising, etc.); and,
- Bonds supported by a general obligation full faith and credit pledge of supporting state or local governments.

Limited recourse and special tax bonds

These bonds are payable from a pledge of the proceeds against a specific tax. This tax could be a gasoline tax, a special assessment, incremental sales tax or property tax levied at a fixed price. Unlike general obligation bonds, which have unlimited ability to raise taxes, these bonds are limited by the source for the revenue to pay the bonds. There is, in particular, no promise of accessing the general taxing authority of the sponsoring jurisdiction for repayment.

Sales tax revenue bonds, for example, have been issued by several California transportation authorities and transit districts. The sales tax bonds differ from most transportation financings because the debt is paid from sales taxes and not from transportation revenues. This type of financing sometimes requires special enabling legislation to facilitate the direct disbursement of tax revenues from the tax collecting entity to the trustee of the bond issuance to perfect the pledge of

those tax revenues and to ensure higher credit ratings. There are two categories of limited recourse non-system revenue bonds – those backed by specific state and local tax revenues and those backed by anticipated federal and other grant funds.

Bonds backed by federal or state grants are commonly referred to as “grant anticipation notes” (GAN). GANs are similar to bonds backed by dedicated non-system local and state revenues, but instead of state and local tax revenues, they are backed by intergovernmental grants. Even though use of the term “notes” suggests relatively short-term issuances, GANs are being issued on a longer-term basis than most notes (although not as long as traditional bonds). A \$500 million issue of grant anticipation bonds was used to help connect San Francisco to the airport. The bonds were used to finance or refinance a portion of the \$1.48 billion San Francisco International Airport extension project, and the Association of Bay Area Governments (BART) was used as the conduit issuer. The bonds were backed by the federal government’s \$750 million Full Funding Grant Agreement (FFGA) and the ability to issue sales tax bonds.

With formula funding-backed financing, transit agencies may use formula funding as a source of repayment for GANs. This does not provide a promise from the federal government for the delivery of those funds, nor a guarantee of the outstanding debt; however, with the guaranteed funding provisions of TEA-21, there is a greater certainty as to aggregate funding levels. Funds that can be used as a source of repayment are the same funds that can be used to pay for capital projects on a PAYGO basis, with the same requirements and restrictions as to use.

In the case of Full Funding Grant Agreements-backed Financing, an FFGA is a multi-year federal funding arrangement under which FTA spreads its grant commitment over a 6- to 10-year or longer time period to reduce the annual burden of funding large capital projects. FTA’s funding schedule is not an

irrevocable pledge, but rather a best efforts target, subject to annual appropriations by Congress. In recent years, FFGA grantees have begun borrowing against their grants receivable to monetize the proceeds to meet construction requirements.

Revenue bonds

Revenue bonds are used to finance municipal projects that generate revenue (e.g., leasing a fleet of buses). This revenue is used to make interest and principal payments to the bond holders. Often, states and their sub-divisions create certain agencies and authorities to perform specific tasks. Many times, the agency or authority has the ability to levy charges and fees for its services. TEA-21 allows transit operators to issue bonds secured with transit system revenues. The proceeds from the sale of bonds may be used as a part of local matching funds for a transit capital project. This increases flexibility and local funding for these projects.

Fare box revenue bonds are usually issued by transit agencies. These are secured by a pledge of the revenues collected by the operation of the transit system. Fare box revenue bonds are rare due to the simple fact that most transit systems operate at substantial deficits. Transit riders on average pay less than 40 percent of transit operating costs. Federal, state, and local subsidies are necessary to maintain operations. Large metropolitan systems with well developed routes and consistent ridership levels are most appropriate for fare box revenue borrowing. Even with such a transit system, other dedicated subsidy sources such as sales taxes or bridge tolls may be essential to obtain an investment grade rating on the debt instrument.

General obligation bonds

General obligation bonds are issued for municipal projects that do not generate revenue (such as a government office building). These bonds are backed by the full faith and credit of the issuer. Many bonds issues by states, cities, or county

districts also have the added security that issuers can raise property taxes to ensure payment. This guarantee is of an unlimited nature. The issuer can raise taxes as high as they want to pay the bonds. If the property tax is not paid, the property can be sold at auction, giving the bond holder a superior claim above mortgages, mechanical liens, and other encumbrances.

Short-Term Bonds

A variety of short-term debt-financing mechanisms are available to transit agencies. These financing mechanisms are generally deployed to bridge a gap between the desired acquisition or construction start date and the availability of permanent financing or grant and other PAYGO funding sources. Short-term debt mechanisms include: tax and revenue anticipation notes, grant anticipation notes, and bond anticipation notes.

Tax anticipation notes (TRANS)

Tax and revenue anticipation notes are issued in anticipation of future tax receipts and other anticipated revenues. They are generally issued as general obligation securities and used to meet operating costs prior to the availability of tax revenue sources. This gap often occurs because taxes are collected on a periodic rather than on an ongoing basis.

Bond anticipation notes (BANs)

These instruments are issued to obtain financing for projects that will ultimately be financed through the sale of long-term bonds for cases in which that long-term issuance takes place at a later date. This can be due to a number of factors, including legal limitations on debt issuance, market timing considerations (including prevailing interest rates), or the desire to pool the financing of a particular project with other projects that are not yet ready to go to the market.

Other Funding Opportunities

Leveraging market access

Smaller agencies seeking debt finance are discovering opportunities to partner for greater leverage in the markets. State and local agencies are taking steps to support such pooling. There are, of course, challenges to partnering, including limiting tax laws, financial liability concerns, and timing issues.

State revolving funds and state infrastructure banks

State operating revolving funds are an obvious way to help transit agencies secure capital funding for smaller agencies on a pooled basis, while also taking advantage of the greater leveraging power of the state. Revolving loan funds have been in use for some time to meet a wide range of infrastructure needs, but they are only now being applied to transit investments and do face some limitations.

Alternative revenue source

Transit sponsors are experimenting with alternative revenue sources that go beyond traditional fare box and ancillary revenue sources. Some sponsors, for instance, have discovered the potential application of tax increment financing for transit investment. While the direct link between development and transit makes a strong argument for the imposition of fees to support transit, cities typically control tax increment financing programs and have not been willing to give up control.

Multi-modal planning and funding

Some agencies are discovering the advantages of multi-modal approaches for so called “mega-projects” that involve more than one mode of transportation. Through multi-modal approaches, transit can be incorporated into a larger project with other potential revenue sources, such as toll or surcharges and can benefit from legislative initiatives aimed at the entire project.

Public-private partnerships

These are alternative ways for agencies to reduce their direct costs and involvement on projects using funds from private players. Most of these measures have often been associated with capital highway projects rather than with transit projects. Public-private partnerships may be structured in a variety of ways.

1. Mixed-funding mechanisms, i.e., involving the participation of both public and private capital
2. Concessions, i.e., infrastructure leased for a fixed period to a private organization, which manages it on a commercial basis
3. Build, Own, Operate (BOO) mechanisms, i.e., a private organization finances and builds infrastructure, which is owned, tolled and operated for an unlimited time
4. Build, Operate, Transfer (BOT) mechanisms, i.e., a concession awarded to a private organization to finance, build, and operate the tolled infrastructure during a limited period

The next section provides case studies of recent transit projects, primarily heavy and light rail projects, for which transit agencies have experienced major cost overruns.

RISING PROJECT COSTS

With improved financing techniques available to transit agencies, it is expected that the costs will be well planned and, subsequently, well managed. Nonetheless, many agencies have reported rising costs along with delayed opening dates. Some of the major transit projects in the recent past are discussed in this section.

Cost estimates are used for different purposes at different stages of a transit project. During the planning stage, cost estimates are used to determine project feasibility and to compare alternate transit modes or alignments during the environmental process, i.e., the “alternatives analysis” process. During the preliminary engineering phase, cost estimates are used to refine alignment configurations and establish construction budgets. During final engineering, cost estimates are used to refine budgets and evaluate the responsiveness of construction contract bids. At any of these stages, cost estimations can be inaccurate and affect overall cost and skew the projected costs.

A rather extensive study completed in 2003 (Flyvbjerg et al.) reviewed 258 projects completed from 1927-1998 in 20 nations on 5 continents worth \$90 billion in constant 1995 prices. The study showed with overwhelming statistical significance that, in terms of costs, transport infrastructure projects did not perform as projected regardless of the type of project, geographic region or time period. Cost escalation was the rule rather than the exception with cost escalation of rail projects at 45 percent, tunnels and bridges at 34 percent, and roads at 20 percent. Cost performance did not improve over time, and cost estimates were as inaccurate and cost escalation as large as before, even after the new role of the public in transport infrastructure decision-making.

Flyvbjerg et al. concluded that cost underestimation is used strategically to make projects appear under-inflated to gain approval from decision-makers to build, and such behavior explains why cost escalations are so consistent over project type, region, and time. The misleading cost estimates move risk-taking to a different level by masking the true nature of the risk that insurance companies and professional investors are taking.

In a follow-up study, Flyvbjerg et al. outlined the following problems associated with planning for large infrastructure projects:

- Large projects are inherently risky due to long planning horizons and complex interfaces;
- Technology is often not standard;
- Decision-making and planning are often multi-actor processes with conflicting interests;
- Project scope or ambition level will change significantly over time;
- Statistical evidence shows that unplanned events are often unaccounted for;
- Budget contingencies are sorely inadequate; and,
- Misinformation about costs, benefits, and risks is the norm and results in cost overruns and/or benefit shortfalls with a majority of projects.

Transit agencies have come under intense scrutiny for failing to keep their costs under control. Some of the major reasons for high costs are discussed, and specific projects that fall under those specific reasons are cited as case examples. The key reasons for the cost increases include:

- 1) Higher-than-anticipated contract costs;
- 2) Schedule delays;
- 3) Project scope changes and system enhancements;
- 4) Increasing insurance costs; and,

5) Unexpected/unusual circumstances unique to each project.

While it is virtually impossible to assign the increase in cost of a project to one specific reason, a mixture of conditions can be used to explain the cost increases. Some recent capital transit projects are discussed below along with the reasons for the reported cost increases.

South Boston Piers Transitway

The Massachusetts Bay Transportation Authority (MBTA) constructed an underground transitway connecting its existing transit system with the South Boston Piers area. The first phase of the South Boston Piers transitway project was a one-mile, three-station bus tunnel between South Station and Boston's World Trade Center. In 1994, the Full Funding Grant Agreement in the amount of \$413 million was approved, which agreed to provide \$331 million in New Starts funds to the project. In 1999, the project was estimated to cost \$601 million, a 46 percent increase of \$188 million. The transitway was opened to service in December 2004, four years later than originally projected.

The project saw massive increases in costs along the way, even before actual implementation started. In order to address the cost increases and the schedule delays, MBTA submitted a "recovery plan" to FTA in January 1999. In the plan, MBTA agreed to pay for the changes that had occurred after the grant agreement was signed. Under the capital plan submitted by MBTA to FTA in October 1999, the \$331 New Starts funds remained constant. MBTA planned to use \$150 million in federal transit formula funds and \$120 million in state bond funds to finance the remaining costs of the project. The budget was also amended to include \$40 million for project and construction contingencies for future change orders.

The project management oversight contractor, the FTA, and MBTA attributed the project's costs increases to *schedule delays* and *design modifications* that occurred after initial costs estimates. Other cost increasing issues included:

- *Potentially higher-than-anticipated contract costs to construct the last major segment of the transitway tunnel;*
- The delay associated with *deciding* whether to build a new vehicle maintenance facility or expanding the existing facility;
- *A local agency's participation in raising capital for eight vehicles, which increased working time frames; and,*
- *A higher-than-anticipated unit cost for the vehicles.*

BART Project

The Bay Area Rapid Transit District (BART) project was an 8.7-mile, four-station extension to its existing rail system to provide service to the San Francisco International Airport. As of January 2000, the project costs were estimated at \$1.483 billion—\$316.2 million (or 27 percent) above the \$1.167 billion estimated in the grant agreement.

In order to reflect the project's cost increases and new financial arrangements, BART submitted a new finance plan to FTA in November 1999 and applied for a grant agreement amendment on January 21, 2000. The finance plan identified sufficient funds to pay the current \$1.483 billion estimated cost to complete the airport extension. Under the proposed plan, the federal contribution was \$750 million (or 51 percent of the total cost). The remaining \$733 million was to be financed by a combination of state and local funding sources. The state of California provided \$152 million. Local funding sources provided the remaining \$581 million— BART (\$181.7 million), San Francisco International Airport (\$200 million), San Mateo County Transit District (\$171 million), the Metropolitan Transportation Commission (\$26.5 million), and San Mateo County Flood Control District (\$2 million). BART had agreements in place to secure all of the funds.

According to the funding schedule in the grant agreement, BART would receive all of the federal funds committed to the project several years after project completion. As a result, cash-flow shortfalls were expected to occur during the course of the project. In order to cover this shortfall, BART obtained a \$300 million letter of credit secured by future federal appropriations. Furthermore, to account for these shortfalls in its plan, BART revised the total project's financing costs to \$42.6 million, an increase of \$18.6 million over the original amount. BART also allocated an additional \$17.9 million in its proposed plan as a contingency for higher-than- anticipated financing costs.

BART officials attributed increased project costs to a variety of reasons. These included:

- An increase of \$155 million due to *higher-than-expected construction bids*;
- Higher-than-expected costs for *right-of-way, utility relocation, unanticipated mitigations*; and,
- *Third-party contracts* for such things as engineering services; and, construction oversight, which required *redesign* of certain parts of the transitway.

San Juan/Tren Urbano Rapid Rail Line

The San Juan/Tren Urbano Rapid Rail Line is a 10.7-mile, 16-station rapid rail line to serve existing and projected development in the San Juan metropolitan area. The line is expected to carry 113,300 riders a day in 2010. This project is one of FTA's "turnkey" demonstration projects, which incorporates contracts to design, build, operate, and maintain the system.

During 1996 and 1997, seven design-build contracts were awarded for different segments of the project. The grant agreement committed about \$307 million in New Starts funds for the project, which was estimated to cost \$1.25 billion. In January 2000, the project cost was expected to increase to about \$1.7 billion—\$426 million (or 34 percent) higher than the original estimate.

A revised agreement was reached on July 19, 1999. Under the revised agreement, the amount of New Starts funds remained the same—\$307 million (or 18 percent of the cost). The amendment accounted for the project's scope changes, cost increases, and planned use of FTA transit formula (\$141 million) and federal highway (\$260 million) funds for the project.

Under the project's revised finance plan, \$962 million in local funding would go to the project, including \$300 million to repay a federal loan over 35 years. Local funding sources included the proceeds of gasoline taxes, diesel taxes, motor vehicle license fees, highway tolls, and investment earnings on bond proceeds, and petroleum taxes that had been committed by the Commonwealth of Puerto Rico. The Tren Urbano receives substantial annual funding from its dedicated local funding sources, and from 1993 through 1997, the average revenue from these sources was about \$270 million a year. In 1998, the Commonwealth of Puerto Rico committed an additional \$120 million to its annual base from petroleum tax revenues. Some of the primary reasons for cost growth are as follows:

- The primary reason for cost growth was a change in the scope of the project. Approximately two years elapsed between the preparation of the original estimate used in the grant agreement and the award of all the design-build contracts. During this period, the Tren Urbano changed and refined the project's design by adding two stations and 10 rail cars and made numerous alignment changes and station enhancements. The contract awards were \$172 million higher than the original estimate. After the contracts were awarded, an additional \$158 million was approved for enhancements and scope changes for items such as systems work for the added stations, an enhanced fare collection system, and additional construction management services.

- Costs increased by \$52 million (four percent of the original estimate) to cover change orders or unforeseen work not related to scope changes. Approximately \$44 million for contingencies remains in the budget to cover future claims or additional changes.
- A number of contractor issues also affected the project's schedule and cost. Some of the contractors had problems meeting agreed-upon construction milestones because of the lack of skilled labor and a variety of other reasons.

Tacoma Narrows Bridge

The construction of Tacoma Narrows in Washington State was affected by the September 11, 2001 incidents in New York City. The Washington State Department of Transportation signed a \$615 million design-build contract for the bridge. The financing was to be carried out using general obligation bonds. A total of \$840 million was appropriated to finance the project. The bridge is a 5,400-foot suspension bridge across a neck of the Puget Sound between Tacoma, Washington and the Kitsap Peninsula.

The construction, which was to have started in 2000, after innumerable delays, finally started in early 2002. Renegotiations of the contract were carried out before the project finally got underway, but the insurance conditions had changed owing to the events of September 11, which occurred in the interim. Major reasons for the escalations in costs included:

- Insurance premiums jumped 49 percent, causing an increase of \$14 million for insurance and surety bonds. Coverage decreased as the premiums rose so high that the coverage for some risks had to be dropped.
- Certain risks could not be insured using private agencies and the uncovered risk had to be borne by the public entities involved in the project.

- Higher deductibles and increased risks had to be born by the public entities leading to higher overall possible costs.
- In the aftermath of the September 11, many private entities refused to take the risk for terrorism, forcing the public agencies to undertake more risk, thereby potentially increasing costs.

Minneapolis Hiawatha Light Rail Transit Line

The Minneapolis Hiawatha Light Rail Transit (LRT) line extends from downtown Minneapolis to the Mall of Americas through the Minneapolis–Saint Paul Airport. The line will be operated by Metro Transit, an operating division of the Metropolitan Council, the regional planning agency serving the Twin Cities' seven-county metropolitan planning area. Minnesota Department of Transportation (MnDOT) constructed the Hiawatha line on behalf of the Council.

One of the unique challenges that faced the Hiawatha Project Office was the acquisition of federal property through the Fort Snelling military reservation. In order to acquire the 1.5 miles of alignment through Fort Snelling, property exchange agreements were negotiated with five separate military services and federal agencies.

When preliminary engineering for the project was initiated in 1999, an extension through the airport and a terminal station at the Mall of Americas was included. Construction of the line, begun in 2001, required the boring of two parallel 7,400-foot tunnels underneath two active runways at the Minneapolis–Saint Paul International Airport and the excavation of an underground station at the main terminal. Some of the difficulties involved with the project are enumerated below:

- Attempting to acquire federal land introduced both schedule and financial risks to the project.
- Each federal agency was different, with different personalities and different rules.

- Assigning a single individual to be the principle contact with the agency was essential to enable continuity and hasten the procedure.
- The project was constructed primarily through a design-build (DB) contract with a joint venture called Minnesota Transit Constructors (MnTC), which includes Granite Construction, McCrossan Construction, Parsons Transportation Group, and Edwards and Kelcey. One of the difficulties in the agreement was that even though the compensation was described in the property exchange agreement, each building, structure, parking lot, or roadway needed to be designed and a natural tendency evolved to continue to add elements to the scope.

Salt Lake City/University Rail Line

The Utah Transit Authority (UTA) planned its light rail system in 1990. UTA's first line, the 15-mile, 16-station North/South Line, runs at street level through Salt Lake Valley and into the southern suburbs. The line would operate on city streets downtown (two miles) and then follow a lightly used railroad alignment owned by UTA to the suburban community of Sandy (13 miles). The Full Funding Grant Agreement, signed on August 2, 1995, projected an opening date of December 31, 2000. The completed cost of the line, which opened in December 1999, was approximately \$20 million under the original \$312.5 million estimated in the 1995 grant agreement.

A UTA official attributed potential cost savings primarily to:

- *Favorable construction bids* at the outset of the project;
- *Early procurement of vehicles already in production* through another grantee;
- *Reduction of the project schedule* by one year; and,
- The fact that *federal funds were provided in accordance with the funding schedule* in the grant agreement.

UTA and FTA officials negotiated the allocation of unspent funds to improvements to the project's existing scope. For example, UTA hopes to widen some single-track bridges to double-track and to purchase additional vehicles to handle the increased traffic generated by special events. The agencies also suggested amendment changes, which would authorize the use of surplus federal funds from the North-South grant agreement. UTA proposed the construction of a new 2.5-mile light rail line extending from downtown Salt Lake City to the University of Utah—at a cost of \$105.7 million, including a New Starts commitment of about \$84.6 million (80 percent). FTA officials stated that while executing the grant early was not likely, the agency allowed UTA to begin construction using local funds without jeopardizing its ability to obtain a grant agreement at a later date.

Houston Regional Bus Plan

Houston Metro's \$1.0 billion Regional Bus Plan consists of a variety of improvements to its existing bus system. The package includes new and extended high-occupancy-vehicle (HOV) facilities and ramps, several transit centers and park-and-ride lots, bus acquisitions, bus service expansion, and supporting facilities. The Full Funding Grant Agreement, signed on December 30, 1994, covers only the federal component of the project. As of May 1999, the projected opening date was December 31, 2005, or three years beyond the date specified in the grant agreement. The grant amount of \$500 million was supported by the federal government. The grantees requested an increase in funding for the project owing to increased expenditures.

The \$53.5 million dollar increase in the federal component of the project was due primarily to a two-year delay resulting from local contractors' challenging the constitutionality of Houston Metro's Disadvantaged Business Enterprise program. In 1997, the program was held unconstitutional, and Metro appealed the decision. While the federal component of the project has increased, the cost of the overall project has remained constant at \$1.0 billion. According to Houston

Metro, not meeting the funding schedule in the grant agreement did not affect the project or contribute to cost increases.

Las Vegas Monorail Project

The Las Vegas Monorail project began as a private enterprise to connect some of the major hotels in Las Vegas with the city center. As time passed, the entrepreneurs tried to withdraw their investment in the project in favor of government agencies constructing the monorail using public funds, raised by issuing bonds.

In 1997 a monorail company attorney said the project, as envisioned at the time, was going to cost \$65 million. The \$650 million tax-free bond issue that was released later is slated to be the largest ever by the state of Nevada. Indeed, it is almost triple the total amount of bonds the state Department of Business & Industry has ever issued. The contracts that were awarded were initially design-build contracts.

A “Design-Build-Equip” contract is now in place for the project. This contract is with LVMC, Bombardier, and Granite. Only \$342.3 million of the \$650 million total cost of the privately-funded 3.9 mile project is capital construction under this design/build/operate contract. Under the fixed-price contract, the contractor must construct and install the monorail system. Approximately \$141.6 million will be used to construct the fixed facilities (to be completed by Granite), \$189.7 million will be used for the operating system (to be completed by Bombardier), and approximately \$11.0 million is a utility allowance. Under the contract, there is a guaranteed completion date and performance guarantees from the parent companies of Bombardier and Granite.

The balance of the cost is for bond interest, insurance premiums, extra contingencies, and reserves to allow the project-revenue bonds to achieve a triple “A” rating. In some respects, the inflated costs appear to have grown out of

its status as a government-linked project. As the monorail company began seeking state approvals needed for the tax exempt bonds, the project began to increasingly approximate a public rather a private undertaking. Its promoters, in public, continued to describe the project as a private monorail; however, they were actively encouraging state and local officials to amend laws to allow tax-subsidized financing.

Proponents have blamed the massive inflation of the project costs on the decision to meet federal standards for "transit grade" transportation, which would permit an eventual integration of the resort corridor's custom-built trains into a federally funded metro system and help with operating and maintenance costs. These actions escalated costs and turned the monorail into a highly expensive system. The bonds were taken on the premise that high projected ridership numbers would make it a highly successful venture; however, independent reports suggest that such high projections are unusual in LRT in the US and may affect the repayment of the bonds.

Cost Estimating for Underground Transit: A General Oversight

Transit tunnel construction is complex, risky, and often fraught with geologic unknowns. In urban areas, tunnel transit has a distinct advantage of minimizing surface disruptions compared to surface or cut-and-cover transit configurations. However, tunnel construction is an expensive endeavor. While social, political and environmental forces have favored tunnel alignments for many transit systems, the costs of construction have often exceeded budgets, preventing the development of new transit lines or the extension of existing systems and eroding the public's confidence in the ability of tunneling projects to be accurately forecasted.

Traditional construction cost estimating methods rely on historical cost data and are not well suited for underground transit feasibility studies not only because construction costs vary widely on specific projects, but also because such

construction costs are not generally available in cost databases. Furthermore, the inherently expensive and unknown nature of underground construction often leads to inaccurate cost estimates, which in turn can lead to a significant budget shortfall as the project moves from planning and design to construction.

Transit agencies use various methods to reduce costs as discussed in the next section.

WHAT ARE POSSIBLE WAYS TO REDUCE COSTS?

Some of the areas in which the transit agencies are working hard to improve their budget control are explained below.

Construction and Design Contracts

Contract awards play an important role in deciding the costs of the project. Choosing the contract best suited to the project on hand can reduce costs for the agency. Most capital transit investments fall under three major types of contracting, which are explained below. The merits of each kind of process are presented and possible cost issues associated with the contracts are discussed. The allocation of the contract ultimately influences other major costs, such as insurance and bond costs and repayments.

Design-bid-build process

The traditional contracting system involves a two-step process. The owner first contracts with an engineer or architect to prepare plans and specifications for a project and, then, contracts separately with a constructor to build the project in accordance with plans. One of the major arguments, which made this form of contracting so popular, was that separating design and construction responsibilities reduced the ability of contractors and designers to commit fraud by using inadequate materials or unsatisfactory design or construction practices in an effort to save money (Tirolo, 1999).

Referred to as the “design-bid-build” process, this type of contracting features a dominant role by the owner. Much of the risk is held by the owner who drives the process in a series of sequential steps. The steps are stated below.

- *Project requirements* - The owner determines project requirements, using information at his/her disposal and perhaps employs “experts” to help with project definition. This process, known as programming, yields sufficient

- information for the owner to decide to proceed with the project and provides preliminary budget estimates.
- *Project financing* - Determining the source of funding is handled by the owner. In the case of public owners, there are usually several options that range from direct appropriations to revenue or general obligation bonds. It is the owner's responsibility to find and secure project funding.
 - *Project design* - Once the owner is ready to proceed, he/she goes through a selection process to select a designer. This process is usually a credentials-based selection process with price for the designer's services negotiated AFTER the designer has been selected.
 - *The bid process* - Once the design is completed, the owner goes through a publicly advertised, competitive bid process where the contract is awarded to the lowest bidder, determined to be a responsive and responsible contractor.
 - *The build process* - The lowest bidder executes the construction in accordance with plans and specifications, produced by the designer, but provided to the builder by the owner. Upon completion, the builder transfers the facility to the owner, who assumes responsibility for the operation and maintenance of the facility.

The contract award price is not a reliable indicator of the final cost to the owner for construction. Contractor-initiated changes, claims, and bids are not obviously captured at the time of award. Three contracts from Tri-County Metropolitan Transportation District of Oregon's (TriMet) recently completed Westside-Hillsboro light rail extension project illustrate the point. First, on a \$29 million low-bid contract to extend light rail in downtown Portland, Oregon, TriMet received a \$13 million claim late in construction. Second, on a \$104 million low-bid tunnel contract, costs increased \$75 million. Third, on an \$8 million utility relocation low-bid contract, TriMet was forced to delete certain work from it and

issue a separate contract for approximately \$2.5 million to accomplish the deleted work.

Nonetheless, there have been success stories using the traditional means of procuring contracts. On the issue of working within fixed timeframes, Texas Department of Transportation (TxDOT) had significant success within the traditional design-bid-build system by using “A+B” bidding or penalties/bonuses for contractors. The Pierce Elevated Freeway reconstruction in Houston and the recent reconstruction of the Padre Island Causeway are two examples. More recently, a turnpike project under construction in northern Travis and southern Williamson counties (MoPac extension/45 North) was significantly expedited through the use of contractor incentives.

Owner concerns over budget, (schedule, public impacts, technical expertise or capacity, working relationships, or jurisdictional matters) have caused the evolution of a more complex method of granting the contract selected by the owners. This method is called “*Competitive Sealed Proposals*.” This method is similar to the traditional method, except the owner is free to negotiate price and services with the vendors, and selection can be based on a “best value” selection method which considers price and technical merit. First, all those firms that meet a certain technological and proven track record are short listed. These firms are then interviewed separately over other issues before awarding the contract. The two-step low bid is intended to increase the likelihood that a contractor with a record of proven performance in similarly complex work is awarded the contract.

For instance, the government code in Texas explains the principles that public entities must follow in procuring engineering and architectural (E/A) services. “The entity must first select the most highly qualified provider and attempt to negotiate a fair and reasonable price with the most highly qualified provider. If a satisfactory contract cannot be negotiated with the most highly qualified provider,

the entity must end negotiations with that provider, select the next most qualified provider and attempt to negotiate a contract, continuing in order of rankings until a contract is successfully negotiated.”

Design-build process

The owner executes a single contract for both design and construction services. Selection of the design-build contractor is based upon evaluation criteria that are weighted by the owner. The price of the project may be bid or negotiated. This type of contract provides a single firm with the task of providing both the design and the fulfillment of the designated project, i.e., design-build provides single point accountability to the owner for design and construction. Design-build procedures may very well expedite projects by allowing some overlap in the design and construction phases of a project.

The best examples of design-build successes are projects that are especially time sensitive, such as the I-15 reconstruction in Salt Lake City, where the 2002 Olympics imposed a significant deadline. There are also examples of projects where the fast-tracking of projects has not occurred. For example, initial efforts to use the design-build process in Texas on projects such as 45 SE in Austin and LBJ Freeway improvements in Dallas suggest that significant front-end time can be lost as owners attempt to develop a process and sort out risk allocation. Design-build procedures are unlikely to be cheaper and are especially unlikely to reduce an agency's costs.

Potential cost advantages include:

- Owner lessens risk of contract award to a construction contractor who lacks the experience, expertise, or capacity to perform successfully.
- Owner risk for designer-contractor cost issues is avoided. This is one of the major drawbacks of traditional design techniques.
- Owner may fix a not-to-exceed price, based upon known scope.

- Design-build contractor has inherent incentive to consider constructible and value engineering opportunities during design.

Design-build process also has its disadvantages:

- The design-build exemption must be justified, evaluated in a public hearing, and approved by the entity having contract authority.
- Owner does not directly control the final design, and may be disappointed with the final design product.
- Great care should be taken in selection of a design-build contractor. The owner generally does not control the selection of key subcontractors or designers, thereby increasing reliance upon the design-build contractor with regard to quality and performance.
- Definition of the scope is critical. A poorly defined or unsettled scope may result in significant cost increases or sacrifices in project quality or function.
- Lack of checks and balances may expose the owner to shortcomings in design and construction.
- The legal rights and obligations of the parties involved in these contracts may vary from traditional understandings and not be understood. Special attention should be given to allocation of risks.

One of the major concerns of the design industry about design-build is that as a business model, design-build potentially raises the costs of competing for work. In the traditional model, there is a cost associated with being selected by an owner, but rarely does the selection process involve significant pre-design of the project. In a design-build process, however, from two to five firms may be required to essentially perform preliminary engineering, or in some cases, detailed design of a project. For the unsuccessful proposers, this can be a significant cost. That is why the industry has promoted the idea of stipends for unsuccessful proposers, even though stipends rarely cover the cost.

Construction Manager/General Contractor Procurement

In the Construction Manager and General Contractor (CM/GC) procurement, final design is accomplished through the quality based selection (QBS) process and under separate contract to the owner. During the design process, the construction contractor is selected based upon criteria that allow the owner to evaluate performance and price competition. Bid price for construction work is not a selection criterion because the design is not complete. The general contractor also performs construction management duties during design and construction, as defined by the owner. The CM/GC is also at risk for the performance of the construction, following negotiation of an agreement with the owner for a guaranteed maximum price (GMP) based upon the defined scope of work.

A CM/GC contract may include preconstruction services such as design reviews, value engineering, scheduling and staging of the work, pricing of construction options, hazardous materials planning, and quantity reconciliation. The overall GMP for construction may consist of low bid work, value-based selection of subcontractors, or self-performed work by the CM/GC, as governed by applicable rules.

Advantages

- Owner retains QBS process for design and directly controls preliminary engineering and final design.
- Owner lessens risk of contract award to a construction contractor who lacks the experience, expertise, or capacity to perform successfully.
- The contractor at risk for construction is brought on board during design, providing assistance to the owner regarding value engineering, constructible efficiencies, scope clarity, design reviews, pricing, schedule, and budget control. Early contractor involvement results in a better understanding of the contract, fairer risk allocation, and less risk of claims.

- Competitive pricing is obtained and confirmed through “open book” cost reviews.
- Prior to the start of construction, a GMP for construction is established, providing greater budget certainty for the owner. The owner can significantly influence the contractor’s work plan as it relates to quality control, safety, schedule, and mitigation of impacts to the public.
 - Collaboration among owner, designer, jurisdictions, and contractor during design builds a team approach that is likely to carry through construction, thus helping in providing a better end product.

The University of Texas System (UT System), a conglomerate of nine universities and six health institutions, is probably one of the more sophisticated owners. UT System has experimented with design-build but seems to be moving to “CM-at risk” as its preferred delivery mechanism. The main reason to choose such a method is the fact that the owner gets the benefit of designer-constructor synergy, but knows that the designer ultimately represents the owner.

The TriMet in Oregon used CM-at risk contracting for one of its projects to construct a building to locate its light rail vehicles. The reasons behind the decision were described: *“Developing a construction staging approach that is compatible with service operations was essential. Construction contractor input during design is essential in developing a realistic, cost effective, and executable construction staging plan. TriMet operations demand that the contractor focus on the expansion work and get it done quickly, safely, and in accordance with TriMet track access procedures. Having construction contractor input during design will increase the risk that the construction staging plan makes the plan realistic and cost effective according to the project managers.”*

Studying all available options for contracting and then choosing the most suitable one for the study can save transit agencies millions of dollars and also improve

other pertinent issues such as timeframe of completion, reliability and quality-related matters.

Federal Regulations

It appears that federal performance bond regulations may have unintended consequences. At the present time, federal rules require a 100 percent performance bond as insurance for every construction contract, which results in a transit contract being divided into smaller contracts to enable contractors to be bonded. Bonding of multiple contractors increases the costs, as other aspects of large projects such as contract management and inter-project coordination become more complex. A review and relaxation of the 100 percent requirement for the performance bond could minimize the problem and help contain at least some of the associated costs.

Are estimates always accurate?

When a new system is pursued, or a new mode of transit is introduced, costs are often estimated based on existing historical cost prices for similar projects. Dissimilar geographical, socioeconomic and political considerations in different regions cause skewing of the costs. Expenses, which run higher than initial costs, can be mistakenly projected as rising costs, when they are, in fact, unavoidable price increases.

Some ways to alleviate such false starts are listed below:

1. Constructability and estimator experience with construction methods are paramount to the development of a realistic cost estimate.
2. Production-type estimates that account for geography and geology of a project must be used to establish accurate budgets.
3. On large, complex transit projects, contingencies that account for allocation of risk and market conditions must be incorporated into the cost estimate.

4. Construction cost estimates for projects that are either a new system or integrate a new mode must incorporate higher contingencies to account for unknown conditions.
5. Cost estimates should always be reported in the year of estimation dollars. Previous cost estimates must be escalated as year of estimation dates shift during project development.
6. Contingencies, escalation, year of estimation dates, and other cost estimating intricacies must be explained to the public. Project budgets that are transparent to the public are less likely to go awry or be criticized.

Insurance Issues

Insurance costs are divided into two categories of investment projects: property insurance and liability insurance. Property insurance depends on the magnitude and the size/cost of the project. Liability involves the project complexities, specific designs, and the conditions prevalent for the site.

While property insurance is proportional to the net final worth of the system developed, liability insurance can depend on the track record of the contractors, and transit agency and may include lower costs even for highly complex projects. A recent study found that while many agencies require contractors to purchase insurance bonds, obtaining bonds for large projects could be difficult. According to the study, in the case of rail, “the bonding industry has shrunk and is hesitant to post bonds for rail cars because the industry has a reputation for problems and delays. This affects the size of the contracts which can be offered and the pool of contractors eligible for each contract.”

Some interesting aspects of insurance that have altered costs in a major way are discussed below.

Neo-traditional insurance policies

Large construction projects are becoming more difficult to finance because of increasing costs, lack of control, and rising litigation. Owners and contractors of these projects want innovative solutions to decrease the cost of construction, while making the project safer. Under “wrap-up” insurance programs, project owners (such as state departments of transportation and transit agencies) purchase insurance to cover all the parties involved in a project—the owner, the construction manager, the general contractor, and the subcontractors. This procedure has certain advantages:

- Owner/contractor (whoever issues the insurance policy) pays the cost of the insurance on a direct basis, as opposed to paying indirectly through inclusion in the contractor's bids;
- Contingency (e.g., inflation and rate increases) and profit loading applied by contractors to their actual insurance costs are avoided;
- Duplication of premium costs where contractors and each of their subcontractors end up insuring the same cost elements can be avoided;
- Bids with/without insurance costs as a bid line item can be examined; and,
- Only the ultimate net cost of the insurance is paid; all premium discounts, economies of volume purchasing, and dividends for good experience flow directly to the owner.

On the South Boston Piers transit-way project, the PMO contractor recommended that the grantee use “wrap-up” insurance rather than the traditional method of insuring the project under which all parties involved in the project would obtain insurance independently. By selecting wrap-up insurance, the grantee was able to achieve an initial savings of \$14.1 million and potential total savings of \$21.1 million.

Post-September 11

In the aftermath of the September 11 incidents in the U.S., insurance companies were unwilling to handle large transit projects due to their susceptibility to possible terrorist acts. This increased the liability issues for public agencies, which had to serve as insurers for the transit projects. To reduce the impact on these agencies, the federal government proposed an act called the Terrorism Risk Insurance Act of 2002. President Bush signed into law the Terrorism Risk Insurance Act of 2002 (TRIA) on November 26, 2002. The law established a temporary federal Terrorism Insurance Program that provides a transparent system of shared public and private compensation for insured losses resulting from acts of terrorism to protect consumers by addressing market disruptions and ensures the continued widespread availability and affordability of property and casualty insurance for terrorism risk. In addition, it allowed a transitional period of three years for the private markets to stabilize, to resume pricing of such insurance, and to build capacity to absorb any future losses, while preserving state insurance regulation and consumer protections. The federal government undertook 90 percent of the liabilities and made it mandatory for insuring agencies to insure against terrorism. While this has increased the supposed safety of the project sites, it has also increased the insurance costs, making it difficult for small capital transit investments to raise sufficient amounts to provide sufficient insurance levels. On December 22, 2005, the Terrorism Risk Insurance Extension Act of 2005 was signed into law and extends the TRIA through December 31, 2007.

Operating insurance costs

While transit agencies also need insurance for maintaining their fleets, there have been high costs in operating insurance as well. A study conducted by the Wisconsin Department of Transportation to investigate higher insurance costs, concluded the following:

1. There is insufficient competition during the procurement process for the insurance. Transit agencies are charged anywhere between 30-45 percent over the insurance premiums paid by private coaches due to insufficient checking process during insurance procurement;
2. Transit managers should be more involved in the procurement process;
3. Specifications for coverage should be improved, and safety engineering programs and services provided by insurance agents should be improved; and,
4. Group insurance programs should be investigated.

Among listed reasons, group insurance was given the highest priority. Following the recommendations of the study, 12 districts in Wisconsin agreed to call for insurance costs from various companies by recruiting two agencies to quote their prices. When study recommendations were followed, it was found that insurance premium costs fell at least 30-45 percent and saved the districts \$225,000 annually.

Design Issues

Many transit agencies often pursue ambitious projects that involve setting up systems that are unique to the agency. This increases costs and the complexity of the project. Systems, especially rail, have persisted with the early designs of tracks and vehicles to cut down on capital costs. This affects operational profits and reliability in some cases due to poor fuel efficiency, lower speeds etc., but this is a trade-off that most transit agencies are willing to take.

IMPLICATIONS FROM LITERATURE REVIEW

CUTR researchers conducted an exhaustive review of available materials concerning costs related to major transit construction projects. Eight specific cases were reviewed to determine what, if any, costs associated with construction increased, the reasons for cost escalation/savings, and any recommendations offered to improve cost effectiveness in the future.

The eight case studies included projects in the following seven states and one project in Puerto Rico:

- Massachusetts – Transportation Authority
- California – Transit District
- Washington – Department of Transportation
- Minnesota – Department of Transportation
- Utah – Transit Authority
- Texas – Transit District
- Nevada – Private Enterprise

The projects were managed or under the jurisdiction of a variety of different entities including:

- Transportation Authority (1)
- Transit Authority (1)
- Transit District (2)
- Department of Transportation (3)
- Private Enterprise (1)

Following is a listing of the nature of the projects:

- Underground Transit Way

- Rail System Extension
- Rapid Rail Line
- Suspension Bridge
- Purchase of Federal Land for a Light Rail Transit Line
- Light Rail System
- Bus System Improvements
- Monorail

It is generally accepted that transit agencies have come under intense scrutiny for failing to keep their costs under control. In four of the eight cases, significant cost overruns plagued the projects.

- Schedule delays and design modifications caused a 46 percent increase of \$188 million for an underground transit way that opened four years late.
- Higher-than-expected construction bids including right-of-way costs, utility relocation costs, unanticipated mitigations, and third party contracts for engineering services were identified as the cause of a 25 percent increase of \$316.2 million increased cost for an extension of an existing rail system.
- An FTA “turn key” demonstration project, which incorporated contracts to design, build, operate, and maintain a rapid rail line, experienced a 34 percent increase of \$42 million.
- The cost of a monorail developed by private enterprise grew from \$65 million in 1997 to a \$650 million tax-free bond issue.

Two of the eight cases were negatively impacted by administrative difficulties:

- There was a \$53.5 million increase in the federal component of bus system improvements due to a two-year delay resulting from a

constitutional challenge of the Disadvantaged Business Enterprise Program.

- The purchase of federal land for a light rail transit line required the construction of two parallel tunnels underneath two active airport runways. Property exchange agreements had to be negotiated with five separate military services and federal agencies.

One project actually opened early and under budget:

- A Light Rail System, which received a Full Funding Grant Agreement in 1995, opened in December 1999 rather than on the scheduled date of December 2000 at a cost \$20 million less than the \$312.5 million budgeted.

Only one of the eight projects suffered from increased insurance premiums:

- Construction of a suspension bridge that had been planned for 2000 was delayed until 2001, after the events of September 11, 2001. In the interim, the cost of insurance and surety bonds increased by \$14 million.

Researchers found that insurance costs served as a primary factor in escalating the costs of only one of the eight projects, and the escalation appeared to be coincidental to the timing of the project, i.e., associated with concerns driven by the September 11 attacks on the World Trade Center.

The research tended to indicate that the rise in insurance costs was being driven by the rise in overall project costs resulting from increasing material costs, lack of project oversight, and expansion of the original “concept” of the project. In the aftermath of the September 11 incidents in the US, insurance companies were unwilling to handle large transit projects due to their susceptibility to possible terrorist acts. A temporary federal Terrorism Insurance Program was created

pursuant to legislation to provide shared public and private compensation for insured losses resulting from acts of terrorism to protect consumers by addressing market disruptions and ensure the continued widespread availability and affordability of property and casualty insurance for terrorism risk. Research speculated that the program resulted in increased insurance costs for small businesses.

Since surety bonds and performance bonds are based on the “value” of the project, as project costs increase, bond costs associated with the project increase as well. Research was void of discussion regarding a disproportionate rise in insurance costs.

STAKEHOLDER PERSPECTIVES

Following the literature review, researchers determined that direct discussions with stakeholders were necessary not only to explore perceived difficulties with insurance and bonding costs; but also, to determine the level of interest in participating in a proposed roundtable. The roundtable would afford participants the opportunity to discuss firsthand the issues surrounding insurance and bonding costs, identify common understandings and solutions and enable FDOT to develop a core of industry experts that could be used as future resources.

As researchers embarked on the next phase of the project, they again reviewed the project objective, which directed investigation behind the recent rising costs in insurance and bonding for transit projects and the identification of ways that transit agencies could minimize these costs in their major capital programs. The research team interpreted this FTA directive to mean capital intensive transit construction projects which would be primarily projects such as those involving rail or bus rapid transit systems.

Following the guidance put forth in the research project description, the development of a roster of initial contacts was begun and included representatives from FTA, transit agencies, insurance agencies and industry associations, bonding agencies and industry associations, contractor associations, private consultants/FTA PMOC, and FDOT project manager. Additionally, a “Leadership APTA listserv” request was generated through the National Transit Research Center at CUTR; the three respondents were added to the roster of initial contacts.

Identifying agencies that fit the project criteria, shared commonalities, and were willing to take the time to participate in the research project was challenging

given the lack of information gleaned from the research and the less than positive response from the Leadership APTA listserv request.

Since one of the anticipated outcomes of the project was the utilization of the findings to help contain costs related to insurance and bonding for anticipated major transit construction projects in Florida over the next five years, FDOT encouraged the representation of Florida agencies in the interview process and in the roundtable discussion, as appropriate.

In reviewing the transit agencies in Florida, the team found that APTA's website placed Miami Dade Transit, the state's largest transit agency, in the second tier classification: systems having 500 – 999 buses. Orlando (LYNX) and Pompano (Broward County Transit) both placed in the third tier classification: 200 – 499 buses. In order to ensure appropriate representation of Florida's transit agencies in the project findings, these agencies (the three largest in Florida) were included in the roster of potential project participants. In further support of Florida representation, Hillsborough Area Regional Transportation Authority (as a respondent to the original listserv request), the South Florida Regional Transportation Authority (as the authority responsible for TRI-RAIL), and Miami International Airport (due to the amount of intensive capital construction projects currently underway or completed in the last several years) were also included.

Heavy rail and bus rapid transit systems are part of Miami-Dade Transit's construction portfolio; however, no other agency in Florida has the same experience. Thus, the team continued to look outside of Florida to agencies that had implemented or were implementing rail, bus rapid transit systems, or other major capital construction projects for participation in the research project.

A survey tool was developed to help ensure consistency of questions and to assist in keeping the interview geared to project-specific discussion. A copy of the survey tool is included as Attachment A.

As referrals were provided from the first contacts made by researchers, the roster was expanded and eventually included 34 potential contacts. A listing of potential interview participants is included as Attachment B. Of the 34 potential contacts, only 21 individuals participated in an in-depth interview or a portion of the interview, and 18 individuals were included in the potential roster of roundtable participants. The final roster of potential roundtable discussion participants is included in the next section of the report.

Impact of September 11

Respondents were provided with a brief overview of the project and objectives. Respondents that voiced opinions about the impact of September 11 on the costs of risk insurance uniformly agreed that costs did increase after September 11. However, the spike in costs was not restricted to any single part of the construction industry; costs seemed to level out approximately two years after September 11.

Prior to September 11, almost anyone could obtain a bond. The overall impact of September 11 on the economy and the losses and pay-outs associated with September 11 changed this practice. At least three respondents felt that the threat of terrorism was still a driver influencing increases in the cost of risk insurance, especially in light of more recent terrorist attacks in London and Madrid.

Bonding

Surety industry representatives were in agreement that increases in costs associated with bonding have been slow, steady and significantly less than increases seen in overall construction costs. Bonding costs are tied directly to

increases in the overall cost of project construction. It is difficult to separate the increases in the cost of bonding due to industry-related drivers from the increases in bonding costs due to the overall cost of the construction project, since the cost of bonding is a percentage of the actual construction costs.

Increases in bonding cost can be found in projects with marginal contracts that are long-term in nature (three to four years), projects with long-term warranties, and projects that are very large and/or complex. The longer the duration of a construction project, the higher the risk to the surety company.

Actual premiums are calculated at a rate between 0.5 percent and 2.0 percent of the total cost of construction and are, thus, dependent upon the size and complexity of the project. Other factors included in the calculation of bonding premiums are the contractor's financial status, history, and portfolio of work. Premiums collected by the bonding industry have increased 8.0 percent to 15.0 percent. Surety representatives also indicated that increases in the cost of surety bonds are not seen as a factor in escalating construction cost now or in the foreseeable future.

Although the surety market has stabilized since September 11, there are still some challenges today in securing surety bonds for large construction projects, especially projects with anticipated costs of \$100 million or more. In the past, there was little difficulty associated with securing bonds for projects; however, in today's world, it is more challenging due to re-insurance companies not promoting bonds as freely as they once did. The number of companies issuing bonds for projects of \$100 million plus has decreased to only one or two.

Respondents indicated that in today's environment of heavy building construction, security companies are scrutinizing contracts and proposals more closely. In the past, bond form designs were generally more onerous to the

contractor. However, today, there is a more complicated negotiation process prior to developing the bond form and contractors are trying to make the bond forms more uniform than the current owner obligees approach.

Although surety bond rates have not increased disproportionately to overall increases in the construction industry, other risk insurances have increased significantly. Increases are a reflection of the types of risks covered, primarily performance-based versus liability-based.

Contractor Issues

Bid packages that are prepared some time before the bid releases often reflect the engineer's estimate of costs at the time of preparation rather than at the time of release. In an effort to ensure that cost escalation incurred between original cost estimates and current market prices are covered, contractors often add to their submitted cost estimates. Several respondents suggested that this is seen as being more in the environment of doing good business, i.e., covering the costs of doing business in the present time rather than padding costs for profit.

The challenges associated with the inconsistency in bid estimates versus present time actual costs appears to be more of a problem with public sector bids than with private sector bids. Contractors and subcontractors have asked what can be done about this and have identified the need to develop a mechanism that better addresses this issue and protects all parties.

Contractors also need to protect themselves from the impact of unanticipated increases in cost (i.e., cost of concrete and delays due to lack of skilled workers) that are beyond the control of the contractor. In order to lessen the impact, contractors often submit costs that are not the true, actual costs, but rather costs adjusted for contingencies and submitted as actual, true costs. One respondent indicated that he believed this to be reflective of current practice; contractors put

in contingencies upon contingencies. Another respondent suggested that this occurs as often as eight out of 10 times.

In some cases, contractors face challenges in securing bonds due to the individual contractor's capacity. The contractor's building portfolio might be at a maximum level or near the upper end of total capacity, making it difficult if not impossible to obtain bonding support for new projects. A contractor's ability to handle all the work comes under serious scrutiny. It is rare that a contractor will go under because of one failed project. Surety bonds are not written to sustain a loss as are automobile insurance policies; a bond is given because the surety company believes the project will succeed. Substantial consideration is given to whether new contracts will compromise a contractor's resources and the contractor's ability to support an expanded portfolio of projects.

Simply put, a big driver in increasing construction costs is the never ending issue of supply and demand. There are far too many construction projects and far too few skilled workers. In addition to the demands for construction resources to support the current building boom our country is experiencing, the re-building of communities that suffered severe damage during the 2004 and 2005 hurricane seasons has added to the demands for construction resources. Global need, especially as related to steel and concrete, has added yet another level of demand. The escalation of property values plays a big factor in projected construction costs. Soaring real estate prices have become a significant driver in the increases associated with major construction projects.

Lack of skilled workers, supplies and materials, difficulties with real estate acquisition, and intensive weather conditions result in construction delays and contribute to fueling the increases in the overall costs of major capital construction projects.

Liability Coverage

When evaluating escalating costs associated with risk insurance, it is important to bear in mind that increases in the cost of risk insurances are related to many factors and, in some cases, are regionally driven versus nationally influenced. This is especially true in coastal communities in Florida, where insurance for properties located within one mile of the ocean is extremely difficult to obtain, if it can be obtained at all. Although there has been a slow and steady increase in liability coverage, little change was seen last year. According to one respondent, commercial property insurance increased roughly 15 percent over the past few years, while personal property/homeowners insurance has increased anywhere from 25 percent to 50 percent or more.

One of the primary problems in Florida is the availability of insurance with few to no companies willingly to write policies in the state. Costs associated with commercial liability insurance are based on many variables, including project type and scope, owner or contractor, and location. In Florida, wind insurance is required for construction projects and commercial properties. Currently, the only way to obtain this insurance is through the state. The state just re-opened this avenue of insurance in July 2006. Floridians are experiencing significant increases in the cost of homeowner's and business insurances, forcing some residents and businesses to consider moving out of the state.

An article in the September 16, 2006 edition of the *Miami Herald*: "New State Pool to Write Policies" written by Beatrice E. Garcia, stated that a new commercial property pool will be established to cover building owners and small businesses in Florida. The pool will be operated by the new Commercial Joint Underwriting Association (JUA). The article further states that "when the Office of Insurance Regulation surveyed businesses this summer, properties valued under one million dollars were the ones having the hardest time getting coverage." The

article also indicated that the JUA might consider writing larger policies in the future.

According to an article written by construction law expert Brain G. Friel, Esq. entitled: "Risk Management for Construction Projects: Using all the Tools in the Toolshed" that appeared in a publication of his firm Greenberg Traurig, the importance of appropriate planning to mitigate loss potential is essential. Mr. Friel stated that such planning was one of the only ways to help ensure that there was a balance between the transaction costs associated with the risk management and the need to mitigate exposures. Coordination between legal counsel and insurance brokers can be essential in selecting the most appropriate strategy. Without proper planning, all available options might not be considered or too many might be put in place resulting in overlapping insurances and greater costs.

Contracting with Government

One representative from the surety industry commented that while attending a meeting in Florida, the issue of FDOT construction bidding was discussed. The question of why there was less bidding on FDOT work versus bidding on private sector work was posed to the audience. Feedback from meeting attendees indicated they thought this was due to the private sector work providing a greater margin of profit than FDOT work. Additionally, it was indicated the private sector work was seen as having fewer challengers, hassles and less overall frustration than work with FDOT or other government entities. An example of this issue was provided and is related to a FDOT road construction design project for a four mile stretch of roadway in the Florida Keys. Apparently, an FDOT engineer released the bid for \$45 million. The lowest bid received was for \$69 million with the next lowest bid \$17 million higher.

Other interview participants from the insurance industry also cited the challenges and associated problems contactors/sub contractors often face with bid releases

based on estimates developed two years prior to the actual bid release. Once again, it was indicated that this happens more often in the public sector rather than the private sector.

Opportunities for Cost Savings

In support of the findings of the literature review, first hand experience of at least one transit organization demonstrated that owner-controlled insurance programs or “wrap-up” insurance was an effective mechanism for saving dollars and covering all insurance needs.

New York Metropolitan Transportation Authority (NY MTA) not only saved millions of dollars, but also was able to cover insurance needs such as construction defects, a category not often funded via traditional insurance. The use of creative “wraps” seems to be the most often discussed and explored alternative to reduce insurance costs.

Due to the large size of NY MTA, they were also able to take advantage of the benefits of captive insurance, an alternative insurance mechanism, to save even more dollars. With captive insurance, an organization/company creates a stand alone entity, generally a subsidiary of the organization, for the purpose of insuring all or part of the parent company’s risks. A captive insurance company provides a mechanism for the parent company to take on favorable layers of risk and administer their own claims. However, as an insurance placement tool, few transit agencies are able to use captive insurance due to monetary constraints, agency size, organizational structure, or other reasons.

During interviews with an APTA representative, researchers were informed that over the past few years, the APTA Procurement Committee has conducted educational program sessions related in part to the increasing costs of insurance and bonding. The Committee focuses on the relationship of the buyer and seller

of services, in this case, the acquiring of bonding and other risk insurances by the transit agency. Hence, they are involved with helping people understand the relationship of the buyer and seller in the context of the procurement process. Additionally, they present educational sessions on best practices and have included information such as graduated bonding amounts, earlier release of bonding and creative wraps under the umbrella of best practices.

Independent Evaluation of Bonding and Insurance

Through the interview process it was learned that in order to evaluate effectively the areas of bonding and insurance, the two topics should be treated and reviewed separately, as one is related to liabilities and protection of assets, while the other is related to work performance. At least five of the respondents recommended separating bonding and insurance. The two industries assume different types of risk. Bonding assumes risk related to performance and maintenance. This type of risk is associated with the contractor defaulting, the business not surviving the length of the project, and the payment of sub-contractors. As a performance-based risk taker, the bonding industry tracks the overall increases in the economy in general versus the insurance industry tracking index more specifically.

Insurance assumes risks associated with the protection of assets and is linked more directly to property damage sustained by wind, hurricanes, acts of nature, and terrorism. As such, the costs have gone up considerably. In some cases, builder's loss/risk has increased 200 percent or more.

Though both industries are based on the assumption of risk, the insurance industry is more vulnerable to threats of terrorism and natural disasters than is the bonding industry. In order to achieve a better understanding of the trends related to costs, the challenge of finding insurance companies willing to cover new projects and other issues associated with risk insurance, it would be

preferable to separate the issues of bonding and insurance and evaluate them independently as cost drivers to escalating costs of major capital construction projects.

Transit Agencies

Of the six transit agencies that participated in interviews, only one indicated that the increases in costs associated with insurance and bonding for major capital construction projects were perceived as disproportionate to the escalation of construction costs overall. None of the Florida agencies interviewed shared this perception nor were they aware of any problems relating to major capital construction and contractor capacity. Increases in costs were seen as more economic-based, i.e., limited supply of certain materials such as concrete, steel and skilled labor creating higher demand and thus higher prices.

Delays due to problems experienced with bid releases increased costs significantly for one Florida agency, while cost overruns of between 3 percent and 3.5 percent (not related to insurance and bonding costs) were experienced by another.

It appears that agencies do not necessarily track the costs of bonding and insurance separately, but often include these expenses in the overall construction project budget projections. Providing specific information in response to interview questions would necessitate researching archived files, which is a time consuming task for already overburdened staff. One agency did experience a seasonal problem when contractors were unable to obtain bonding during a particularly problematic hurricane season; however, once the storm season was over, the problem was resolved.

One agency was able to share their experiences related to unique applications of contracting that involved the first time use of state legislation enacted in an effort

to build transportation projects more effectively for a non-road project. Benefits related to securing sufficient levels of bonding by breaking down the project into phases, cost savings using CCIP, and other insights were in developing the proposal for the third most costly rail proposal in the country.

Florida Transit Agencies

Interviews with the largest transit agencies in Florida provided the following comments:

Hillsborough Area Regional Transportation Authority (HART)

HART uses the mechanism of request for proposal (RFP) for contracting construction projects. The RFP incorporates a requirement for a minimum, standard amount of risk insurance. As a self-insured agency, HART has not experienced problems securing general liability coverage or any other types of insurance coverage. If there has been a problem with contactors obtaining surety bonds, HART is unaware of it. From a construction perspective, HART was unable to identify a problem with increases associated with the costs of insurance and bonding for construction projects

Broward County Transit (BCT)

BCT experienced a significant increase in the overall cost of one construction project that started out as a \$2.6 million project and is presently out to bid as a \$4.3 million project. The County Purchasing Department re-bid the project several times due to problems associated with the bid; the multiple bids and associated delays have generated the increase in costs. Bids are often put out with a lump sum estimated cost. Respondents are expected to factor in all costs within the lump sum estimate. Increases in the cost of surety bonds and other risk management insurances are seen as a result of economics in today's world. Construction costs, especially those related to concrete, steel, labor and fuel, have increased significantly as a result of supply and demand. Increases in

costs related to insurance and bonding are part of the contractor's cost of doing business and are in response to market forces.

Miami-Dade Transit (MDT)

MDT has two construction projects that fit into the category of capital intensive construction projects. The Palmetto Metrorail Extension was completed in 2003, and the first segment of the Bus Rapid Transit Project (BRT) was completed in 2005. The second segment of the BRT is currently under construction with the Notice to Proceed issued in October 2005.

A former MDT staff member was interviewed for the research project and was able to provide information related to overall costs and the general breakdown of the projects, but was unable to provide a construction insurance-specific breakdown of costs for either project.

The Palmetto Metrorail Project was a \$91 million project. The bulk of the costs were in the areas of right-of-way acquisition and construction (hard costs including labor and materials). Cost overrun was in the range of 3 percent to 3.5 percent with approximately \$4 million of the overrun associated with claims to the civil engineer. Additionally, MDT found that other county agencies were continuing to charge against the project index after May 30, 2003.

The total hard construction cost for both segments of the BRT was approximately \$73 million. Total actual costs, including real estate acquisition and administration-related costs were approximately \$106 million. There was little escalation in costs between segments I and II due to the short length of time between the completion of segment I and the start of segment II. If segment II had been implemented later, it is projected that there would have been substantial increases in costs associated with materials and labor.

The MDT resident engineer for both projects was unable to provide information related to the costs of insurance and bonding for either project. A subsequent discussion with the MDT Contract Administration Office provided the following information. The bid release for the Palmetto Extension went out in 1999 and construction was completed four to five years ago. Performance bonds were part of the general requirements for construction projects; however, exact costs of insurance and bonding would have to be retrieved from old records. There was no recollection about costs related to insurance and bonding being disproportionate to overall construction costs.

Currently, MDT is engaged in no large capital intensive projects. Approximately two years ago there was a brief period when it was difficult to obtain performance bonds; however, that was related specifically to the 2004 hurricane season. The writing of bonds was suspended during the hurricane season, but resumed once the season was over.

Central Florida Regional Transportation Authority (LYNX)

LYNX is currently involved with a construction project for the agency's new operations base that will include facilities for maintenance, storage and refueling. The operating facilities will be able to store and support 200 or more buses, and the support facility will be able to provide support services for up to 600 buses. Respondents were unaware of any significant problems in securing construction-related insurances or of costs associated with risk insurance being disproportionate to overall project costs.

South Florida Regional Transportation Authority (SFRTA) (TRI-RAIL)

Through contacts with SFRTA, a request for an interview with appropriate parties was generated with several follow-up inquiries. Referrals to the Engineering & Construction Office were made; however, due to the number of critical priorities

of this office, representatives were not able to participate in an interview or discussions related to the research project.

Miami International Airport (MIA)

Because of the number of capital intensive construction in which MIA is involved, contacts with MIA personnel were made to determine the level of interest in participating in the research project. Initial inquiries resulted in referrals to Miami-Dade Aviation Department Risk Management Office. Several calls were placed, contact was made with the office, and an interview appointment was scheduled. The interviewee was not available at the time of the appointment. A positive response to subsequent inquiries was not received.

Out-of-State Transit Agencies

Dulles Metro Project (Virginia Department of Rail & Public Transportation)

Due to current and anticipated population growth and increases in the number and size of activity centers within the Dulles Corridor, the decision to extend the present Metrorail system to serve the Dulles Corridor in Fairfax and Loudoun counties was made.

The project is being built by the Virginia Department of Rail & Public Transportation in conjunction with the Washington Metropolitan Area Transit Authority (WMATA), Fairfax County, Loudoun County, Town of Herndon and the Metropolitan Washington Airports Authority (MWAA). The Dulles Corridor Project will represent a 23 percent increase in overall size of the Metrorail system. It is the largest transportation project on which the Commonwealth has ever embarked and the third most costly rail proposal in the country.

This is the Commonwealth's first experience of constructing a non-road project under the state's Public/Private Transportation Act. This legislation was implemented to build transportation projects cost effectively, faster and to

promote private sector investment. Dulles Transit Partners (DTP) investment totals \$25 million.

DTP will engineer, design and build the project. Two world-respected engineering companies, Washington International Group and Bechtel Corporation, form the DTP, which operates as a limited liability corporation. The project utilizes a competitive/negotiated process that differs from a standard design-built bid. If costs run higher than anticipated during the project, the state and the private sector company share the risk.

In order to accommodate funding cycles and insurance requirements, the project has been segmented into two phases. The estimated total cost for the project: approximately \$4 billion. Phase I uses 2006 as the base year for program costs, which are projected to be approximately \$1.89 billion with about \$36 million for insurance-related expenditures. Total Phase I costs, including all expenditures (rail cars included) are estimated to be \$2.06 billion (estimate based on year of expenditure dollars). Phase I consists of 11.5 rail miles, 6 new stations with pedestrian bridges, and 2,300 parking spaces. Implementation of service for Phase I is projected for 2011 with 2012 being somewhat more realistic.

Phase II consists of 11.5 rail miles, 6 new stations with pedestrian bridges at all above-ground stations, and 11,550 parking spaces. Phase II should be ready for service in 2015; however, with the change in funding from federal to MWAA, this could be earlier. The initial timeline was based on funding availability rather than on construction.

Because only one contractor is being used, it was decided to use CCIP (Contractor Controlled Insurance Policy). The contractor will be reimbursed for the cost of CCIP. Using 2006 as the base year, the estimate of cost is \$36 million for Phase I. The cost of insurance is also related to the contractor's safety

record. Additional savings are realized because the overall approach they are taking reduces total costs.

FTA requires projects to have 100 percent of bonding in place. For a project of this size and complexity, meeting this requirement would be very difficult. However, bonding of the Dulles Corridor is not seen as a problem, since it is designed to be constructed in two phases and 100 percent of required bonding will be in place at the time of individual phase implementation. The companies that make up the DTP are two of the largest contractors in the world with parent company guarantees.

DTP will utilize teams of sub contractors for the project and incorporate a 50 percent self-performance level. DTP will be responsible for contractors under their bonding. Without the benefit of having hard data available at the time of interview, the respondent indicated that insurance costs do not seem to be a significant cost driver.

Thus far, the primary cost drivers for the Dulles Corridor have been related to fuel, labor, concrete, and steel. Because this project uses mainly land that is part of public right-of-way versus acquisition of large amounts of new property, a huge cost savings was realized.

The respondent commented on the current trend of looking at indexing bids to prices such as steel, concrete, and labor. When a bid is submitted, there would be an established value for labor and/or materials and set-points to determine who pays what and when. For example, if the price of steel goes up to an agreed upon set-point of a five percent increase, the contractor might be the one to absorb the overrun in costs. If the increase goes up to a set-point of a ten percent increase, the cost might be split between the owner and contractor. Some bids are utilizing premium labor costing to ensure that the cost of highly

skilled labor, such as steel workers, is sufficiently covered at the onset of the project.

As noted by the respondent, construction costs are not flexible. Efficiencies, such as utilizing CCIP, provide savings. A negotiated process approach can provide efficiencies, but the trade off is often loss of control.

Bay Area Rapid Transit (BART)

At the time of interview, BART was getting ready to embark on a \$1 billion dollar earthquake retrofit project. Though the project is just getting underway, the respondent assumed that cost projections for bonding and insurance were disproportionate to overall construction costs; although, no data were provided.

From 1998 through 2003, BART was involved with another major capital construction project. The contractor covered the risk insurance costs and included these expenses in the total cost of the project. Specific cost-related information was not readily available.

The respondent indicated that the increases in the cost of insurances experienced a few years ago were certainly a result of September 11 and the associated losses and pay-outs. However, the increases in costs seen today are not as a result from the threats of terrorism, but from the losses and payouts associated with the 2004 and 2005 hurricanes. Because of the impacts of the hurricanes, the insurance market is suffering from lack of capacity. In California, insurance companies are not required to write earthquake insurance, thus, BART is retrofitting versus buying insurance.

BART has asked the FTA to wave the 100 percent bonding requirement. At the time of the interview, BART was waiting for an answer to this request. From the respondent's perspective, this is one of the first actions a transit agency takes

when trying to reduce costs associated with bonding, and it seems to be the current trend at transit agencies.

BART has not necessarily seen the problem of contractors' capacity in their large scale construction projects; but, has seen this problem in their non-major capital work, where contractors have difficulties obtaining bonds due to portfolio capacity.

The respondent indicated that TRIA has helped many agencies secure insurance for terrorism. Due to cost, many agencies are either not taking out insurance coverage today or they are not getting the same levels of coverage as they once were. There is concern about what will happen when TRIA expires. It appears that the insurance industry has been pushing to allow TRIA to expire.

According to the respondent, some agencies are now opting to be self-insured or are assuming a larger portion of coverage through self insurance. A loss can result in less protection in the future, and the full financial impact of the loss has to be sustained. The use of creative wraps is being pursued by agencies such as NY MTA. The use of captive insurance also helps reduce insurance-related costs. California law prohibits the use of captive insurance, so it is not an option for BART to consider. It was also noted by the respondent that contracting associations are starting to resist wrap-up insurance.

ROUNDTABLE

Both the literature review and the interview process support the premise that the primary cost drivers to intensive capital transit construction include costs associated with labor, materials, fuel, schedule delays, and real estate acquisition. Nonetheless, as challenges such as those associated with contractor capacity, more limited promotion of bonds by re-insurance companies, and increased intensity of natural disasters, continue to escalate the cost of risk insurance, further exploration and open dialogue become a more serious consideration in the identification of solutions.

Presenting the body of findings to individuals who participated in the project and gleaning first-hand reactions, ideas and suggestions on how to address costs and challenges related to risk insurance are important and necessary in order to identify ways to help transit agencies in their struggle to meet construction costs in a world of constrained budgets and decreasing sources of capital investment dollars.

The research and interviews provided the findings; a roundtable provides the forum for dialogue and an opportunity to begin to craft solutions. With an eye to the future, those gathered around the table could perhaps develop into an effective group or become an ongoing FDOT resource for future discussion and solution development.

Suggested Topics for Roundtable Discussions

- Consideration of the benefits of independent evaluation of bonding and insurance as drivers to the overall escalation of costs related to major transit construction projects.

- Dialogue related to the expiration of the Terrorism Risk Insurance Extension Act scheduled for December 31, 2007 and potential consequences to transit agencies upon sunset of the Act.
- Discussion related to the impacts of intense weather on the costs associated with risk insurances.
- Exploration of the trends of indexing bids to prices; incorporating set-points over pre-established values that determine who pays for what (owner or contractor) into bids; incorporating premium labor costs into bids and discussion related to different types of contracting options that can lead to saving project dollars.
- Discussion focused on different types of wrap-up insurances, e.g., OCIP and CCIP.
- Dialogue directed towards the benefits of careful planning and strategy development in choosing risk insurance options and contracting options.
- Consideration of benefits associated with investment of private sector funds into public transit projects.

Organizing the Roundtable

Initially the major challenges confronting the roundtable session were selecting an agreeable date that did not seriously conflict with summer vacation schedules and timing the session so that it in no way precluded completion of the project on-time. Respondents who had expressed interest in attending the conference were contacted to find out their current level of interest and to see if the timeframe of the last week in August would allow for their participation. At the same time, the contacting of newly identified interview participants continued, and invitations to participant in the roundtable were extended to those expressing interest in the research project and associated issues.

Given the mix of potential participants, planning for the roundtable moved forward with the selection of August 21, 2006 as the date and the Center for

Urban Transportation Research (CUTR) at the University of South Florida as the host facility. However, as invitations were formally extended, it was learned that the representative from Dulles Corridor Metrorail Project had moved to a new position in a different agency and would only be able to participate for a specific time period via conference call. The president of the Florida Surety Association found it necessary to change his time commitment due to an unanticipated client related problem; the former director of risk management for the New York Metropolitan Transportation Authority was also unable to participate due to scheduling conflicts.

Though very interested in attending, the American Insurance Association representative was unable to make the necessary adjustments to her schedule to participate in the discussion; her attempts to identify and secure an attendance commitment of another AIA member were unsuccessful.

After the initial contact with the Third Street Project, responses to invitations to participate in an interview and/or roundtable were not received. An offer to participate in the roundtable via conference call was extended as part of the original invitation.

A BART representative had expressed interest in the roundtable during the interview. Follow-up calls to the formal invitation to participate indicated that the individual was looking into attending; however, there was no response to further inquiries. As with the Third Street Project an offer to participate in the roundtable via conference call was extended.

Interest initially expressed by a representative of the Associated General Contractors of America to facilitate member involvement in both the interview and roundtable components of the project did not result in demonstrated interest in either aspect of the research project.

Initial contact with and subsequent invitations extended to the Florida Office of Insurance Regulation for participation in the roundtable did not produce a response.

As the date of the roundtable drew near, the Florida Surety Association was able to identify another board member to participate in the morning session of the roundtable. However, the blend of participants originally envisioned had changed to the point of questioning the value of moving ahead with the roundtable.

Upon further review of the interviews, the responses to invitations to participate in the roundtable, and the lack of demonstrated interest by the transit agencies contacted, it was decided to cancel the roundtable. The mix of those readily willing and able to participate was not broad enough to support the goals of the roundtable specifically or the project as a whole. Furthermore, the findings of the interviews were consistent with the literature review. Efforts to conduct a roundtable were thus disbanded.

Following is a list of the potential roundtable discussion participants:

Insurance & Bonding Industries

- American Insurance Association
- Florida Security Association (Board Member) and CNA Surety
- Florida Security Association (President) and the Hartford Group
- Florida Office of Insurance Regulation

Florida Transit Agencies & Other Florida Based Organizations

- Miami-Dade Transit (Formerly with MDT currently with Miami Dade County Project Scheduling and Compliance Office of Capital Improvements General Obligation Bond Division)

- Miami Dade Transit (Contract Administration)
- Miami Dade Transit Resident Engineer (Palmetto Extension, Busway and Metromover Projects)
- South Florida Regional Transportation Authority (Engineering and Construction)

Out-of-State Transit Agencies

- Bay Area Rapid Transit (BART)
- Dulles Corridor Metrorail Project, VA Department Rail & Public Transportation
- New York Metropolitan Transportation Authority (formerly with Risk Management, currently with Allied North America)
- Third Street Light Rail Project (MUNI)

Other Stakeholders – Transportation Consultants, Contractors Association, and Professional Organizations

- Booz Allen Hamilton, Inc./FTA PMOC (Senior Associate)
- General Contractors of America (Federal and Heavy Construction Division & Surety)
- Federal Transit Administration
- Florida Department of Transportation
- Greenberg Traurig (Construction Law)
- URS Corporation (National Transit)

FINDINGS

The findings of the literature review, interviews with transit agencies, and stakeholder discussions were consistent. Although there have been increases in the cost of risk insurances associated with major capital construction projects, the primary drivers to the escalation of overall increases in costs associated with major capital construction projects are related to: labor, concrete, steel, fuel, real estate acquisition, delays, and other factors not associated with risk insurance.

Impact of Terrorism

Respondents that voiced opinions about the impact of September 11 on the costs of risk insurance uniformly agreed that costs did increase after September 11. However, costs seemed to level out after approximately two years. The literature review found that the 2002 TRIA and the 2005 TRIA helped to stabilize the risk insurance industry, although it is speculated that the program resulted in increased insurance costs for small businesses.

In the case study that indicated insurance costs served as a primary factor in escalating costs, researchers found that the escalation appeared to be coincidental to the timing of the project, i.e., associated with concerns driven by the September 11 attacks. Several respondents expressed concern about the consequences of allowing the 2005 TRIA to sunset on December 31, 2007, as is now stipulated in the legislation.

Impact of Natural Disasters

From the perspective of at least one transit agency from outside of Florida, the impact of the 2004 and 2005 hurricane seasons on the insurance industry was not limited to the Gulf Coast area of the country. The high payouts by re-insurance companies and the associated reduction in industry capacity to place new coverage, have generated significant increases in the cost of premiums and

have adversely impacted the ability of the industry to write new policies in other areas of the country as well.

In Florida, insurance for properties located within one mile of the ocean is extremely difficult to obtain, if it can be obtained at all. Florida requires windstorm insurance for construction and commercial properties, which is only available through the state. The impact of hurricanes and the resultant pay-outs by insurance companies have left few companies willing to write policies in Florida, making availability a major problem for the state. Floridians are experiencing significant increases in the cost of homeowner's and business insurances, forcing some residents and businesses to consider moving out of the state.

However, the Florida transit agencies interviewed were either unaware of any issues related to increases in the cost of insurances as drivers to increases in overall construction costs for major projects or did not perceive the added costs to be significant drivers to the overall costs associated with more increases in major construction projects. One Florida agency did comment on a problem involving the difficulty contractors had in securing bonding during the 2004 hurricane season. The placement of bonds was suspended until after the close of the hurricane season.

Significant Cost Drivers

From the perspective of the respondents, concrete, steel and labor seem to be the big three in the category of the most significant drivers to the escalation of costs associated with increases in overall construction costs of major capital projects. In projects that call for real estate acquisition, acquisition costs run a neck-to-neck race with the big three as do costs associated with delays in construction schedules and procurement of fuel.

The national building boom, the re-building of the Gulf Coast, and the global demand for concrete, steel, and other construction commodities continue to increase costs.

Four of the eight case studies had significant cost overruns, including scheduling delays, design modifications, higher-than-expected construction bids, unanticipated mitigations, and third party engineering contracts. Other reasons for overruns included a two-year delay due to a constitutional challenge of the Disadvantaged Business Enterprise Program and the purchase of federal land for a light rail transit line that required construction of two parallel tunnels underneath active airport runaways.

The availability of bonds for high dollar projects (\$100 million and up) is limited due to the relative lack of promotion of these bonds by re-insurance companies and the limited number of companies issuing bonds for high dollar projects.

Bid packages that are prepared some time before actual release are often not reflective of current construction costs, such as those associated with skilled labor, concrete, steel and fuel. In order to cover these escalations in costs, contractors often add to their submitted cost estimates.

One Florida agency saw the costs associated with one project soar from \$2.6 million to \$4.3 million due to problems related to the bid process that resulted in multiple re-bids and associated delays in final award of the bid. Increased costs were believed to have resulted from several delays.

In order to protect themselves from the impact of unanticipated increases in costs beyond the control of the contractor, contractors often submit costs adjusted for contingencies rather than true, actual costs.

Contractors that are maxed out in terms of their building portfolio can experience great difficulty in securing bonds. In today's world of heavy building construction where there is too much construction and too few workers, contractors can more easily reach the upper end of their capacity. Respondents did not perceive this to be much of a problem for contractors bidding on large, complex and costly projects; however, several respondents commented that they had knowledge of such a problem with contractors bidding on smaller, less complex and less costly projects.

Because of the current cycle of heavy building construction, skilled workers are in great demand. Lack of specialty workers can cause delays to projects resulting in increased costs to the project. Additionally, contractors might be required to raise pay to attract or maintain skilled workers, further increasing project costs. The rebuilding efforts in the areas that incurred storm-related damages during the 2004 and 2005 hurricane seasons coupled with the current cycle of heavy building construction adds up to a lack of skilled workers available to meet the many current needs of the building industry.

Working with the public sector is often seen as more challenging, frustrating and less profitable than working with the private sector. Responders to bid releases sometimes incorporate these aspects into their cost projections, resulting in estimates far higher than those reflected in the bid release. Additionally, the issue of bid releases based on estimates of costs at the time of bid preparation versus the time of actual bid release (cited by two respondents as often being a two-year lag time) seems to be more prevalent in the public sector.

Attempts to secure the involvement of contractors in the research project were unsuccessful.

Bonding & Insurance

Careful consideration of all risk management options available is needed to help prevent overlap of coverage. The placement of too much insurance creates a burden of additional and possibly unnecessary expenses. Careful consideration of contracting options may lead to more cost effective methods, thereby saving agencies substantial dollars.

Some agencies have experienced cost savings through the use of creative insurance packages, such as wrap-up insurance, contractor controlled insurance and captive insurance. Additionally, at least one agency anticipates cost savings as a result of using a competitive/negotiated process and is taking advantage of state legislation that promotes building transportation projects more effectively, faster, and encourages private sector investment.

It appears that many transit agencies do not necessarily track the cost of insurance and bonding associated with construction projects, especially if these costs are incorporated as part of the bid release and/or contract requirements. Providing specific information in response to interview questions would generally necessitate the researching archives for the specific data. These are time consuming tasks for already burdened staff and are not considered to be priorities. This is especially true in light of perceptions that costs associated with insurance and bonding are not primary drivers for increases associated with overall costs of major construction projects. The transit agency resident engineer interviewed during the course of the study was unable to provide insurance cost data for his agency's projects.

The costs associated with bonding have been slow, steady and significantly lower than increases seen in overall construction costs. Increases are often associated with marginal contracts, long-term projects, projects with long-term

warranties or projects that are large and/or complex. Increases in the cost of surety bonds are not seen as a factor in escalating construction cost now or in the foreseeable future.

Costs associated with commercial property insurance are calculated based on a variety of variables, including but not limited to the location of the project, contractor's safety record, size and scope of the project. Often the variables are regionally-based versus nationally influenced. Liability insurance is related to the protection of assets and assumes a different type of risk than the risks associated with bonding. Commercial property insurance is more vulnerable to threats of terrorism and natural disasters, such as those experienced in the 2004 and 2005 hurricane seasons.

Through the interview process it was learned that in order to evaluate effectively the areas of bonding and insurance, the two topics should be treated and reviewed separately. Though both industries are based on the assumption of risk, the commercial insurance industry is more vulnerable to threats of terrorism and natural disasters than is the bonding industry. In order to achieve a better understanding of the trends related to costs, the challenges of finding insurance companies willing to cover new projects and other issues associated with risk insurance, it was suggested by at least five respondents to separate the issues of bonding and insurance. Evaluating the insurances independently as cost drivers to escalating costs of major capital construction projects would lead to a better understanding of issues specific to the industries and perhaps contribute to more effective identification of solutions.

FTA Bonding Requirements

FTA requires projects to have 100 percent of bonding in place. Large, complex projects often have extreme difficulty meeting this requirement. Flexibility in adjusting this requirement is viewed as important in order to ensure that major

capital projects can move forward effectively to meet the needs of the agencies and the people served.

RECOMMENDATIONS

Sunset of TRIA

Currently, TRIA is mandated to sunset on December 31, 2007. Given the ongoing threats of terrorist attacks, it is important for transit agencies to understand how the determination of TRIA could affect them and how they should begin to prepare for such a decision. **Recommendation:** provide agencies with status reports focused on developments related to the sunset of TRIA. In the event the forecast is favored for upholding the current legislation, with assistance from the appropriate organizations (including the risk insurance industry), begin to identify options available to transit agencies for the continuation of affordable terrorism insurance coverage; communicate findings to agencies well before the projected sunset date.

Impact of Natural Disasters

Although Florida transit agencies did not perceive that increases in the costs related to bonding and insurance for major transit construction projects were a driver in overall increases, the state is experiencing critical problems related to the cost and availability of commercial property and liability insurances. Increases in costs and the lack of industry capacity to write new policies are challenges to transit agencies. **Recommendation:** assist transit agencies in: exploring options for reducing costs through the evaluation and assessment of benefits and challenges associated with pooling agencies in an effort to reduce premiums; establishing criteria for participation in transit insurance pools that would help lead to the establishment and sustainability of functional transit insurance pools; and, in providing other needed assistance leading to the implementation and ongoing effective management of Florida-based transit insurance pools.

Government-Related Challenges

The release of bids with cost estimates that are based on estimates projected at the time of bid preparation rather than on present-day cost estimates coupled with bid inflation due to anticipated time lost in the bureaucratic bid process were identified as problems associated with working with the public sector on major construction projects. **Recommendation:** work with FDOT and Florida-based agencies to isolate specific problems and identify better mechanisms for releasing bids that incorporate current cost estimates based on present-day projections; conduct roundtable discussions involving participants from the public and private sectors in an effort to establish better rapport and identify ways to reduce frustration and bureaucratic-based challenges, as well as to identify private sector misconceptions and private sector induced challenges and frustrations.

FTA Bonding Requirements

Several respondents commented on the difficulty of meeting the FTA requirement to have 100 percent of bonding in place prior to project implementation. This is especially challenging when developing and implementing major capital intensive construction projects. **Recommendation:** survey transit agencies to determine the extent of this problem and the mechanisms previously employed to circumvent this challenge, investigate the reasons behind the FTA requirement and investigate bonding requirements for non-transit capital intensive construction projects, through transit organizations and with assistance from and support of the surety industry, identify reasonable and viable suggestions for revisions to current FTA requirements.

Independent Evaluation: Bonding & Insurance

Though the findings of the research project indicated that the increases in the costs related to insurance and bonding for major transit construction projects were not disproportionate to the overall increases in the costs of these projects, there was the recognition that increases associated with risk insurance impact

the bottom line. In order to achieve a better understanding of the trends related to costs, the challenges of finding insurance companies willing to cover new projects, and other issues associated with risk insurance at least five respondents suggested that it would be better to separate the issues of bonding and insurance, evaluating them independently from each other and independently as cost drivers to escalating costs of major capital construction projects. **Recommendation:** develop and conduct independent research projects geared to each component of the risk insurance industry involved with major transit construction projects. In order to be more Florida inclusive, develop research project objectives to incorporate less capital intensive projects as well. Obtain feedback from transit agencies, risk industry representatives and others with vested interest in major capital construction projects for suggestions related to the design, objectives and scope of the projects. With assistance from FTA, FDOT and FTA, identify several transit agencies that would agree to participate in the research projects by tracking costs related to insurance and bonding and that would agree to provide this information for use in research findings and final reports. Since projects are generally several years in duration, initial findings could be developed with ongoing submissions and updating of findings related to the tracking of risk insurance expenses.

Benefit from Real-time Experiences: Dulles Metro Project

The Dulles Metro Project is the largest transportation project on which the Commonwealth of Virginia has ever embarked and the third most costly rail proposal in the country. At the time of interview, the project had not yet been implemented and presented an opportunity for other agencies to learn about the benefits and challenges of some of the unique aspects of the project. The project utilizes a competitive/negotiated process which is not the standard design-built bid. If costs run higher than anticipated during the project, the state and the private sector company share the risk. In order to accommodate funding cycles and insurance requirements, the project has been segmented into two

phases. It is the Commonwealth's first experience of constructing a non-road project under the state's Public/Private Transportation Act. This legislation was implemented to build transportation projects more cost effectively and faster and to promote private sector investment (Dulles Transit Partners investment: \$25 million). **Recommendation:** ongoing communication and status reports related to Dulles Metro Project could provide other agencies with an account of real-time experiences of one of the largest transit construction projects to be undertaken in the country. Fully understanding the intent behind the Public/Private Transportation Act, the benefits envisioned and the experiences of the Dulles Metro Project could lead to similar legislation being replicated in other states. At a time when there is considerable concern about revenue streams for transit construction the promotion of the private sector in the investment of transit projects is timely. Additionally, investigating similar legislative initiatives implemented in other states could help determine the best legislative model for the investment of private sector dollars in transit projects. Following Dulles Metro experiences associated with the use of a CCIP (competitive/negotiated process which is not the standard design-built bid) and the use of a shared risk approach between the public and private sectors could help other agencies determine if there can be a true cost savings utilizing the same or similar approach.

Reducing Costs

Between the decrease in federal funding for transit construction, the competition of other public-serving departments for state and local funds; the need to comply with several federal programs that require additional expenditures, the need for existing transit systems to make major repairs and replace rolling stock, consideration of how to reduce costs in creative and innovated ways is critical. **Recommendation:** joining forces with a university-based transportation research facility that can bring the resources of a business school, an engineering school and their own economic analysis and evaluation skills to the table could help FDOT and/or FTA in the identification and design of creative but

viable approaches to cost reductions. For example, the collaborative effort could explore known cost reduction methods such as indexing bids to be agreed upon, clearly established values for labor and/or materials and set-points that determine who pays for what and when. Exploration of such methods could lead to the team's envisioning of variations of the indexing model or the development of new models to reduce specific costs, or a combination of costs related to major construction projects.

Attachment A - Telephone Interview Questions

In order to ensure interview consistency, the following questions will be asked of all respondents:

- 1) What type of major, capital intensive transit construction project have you undertaken in the last five years?
- 2) What were the circumstances under which and environment in which the project was built?
- 3) What was the total cost of the project? What were the largest cost drivers of the project?
- 4) What was the cost of insurance and bonding?
- 5) Was the cost of insurance and bonding disproportionate to overall construction costs? If so, were there unusual issues related to insurance and bonding?
- 6) Based on your experiences with major transit construction, are costs related to bonding and insurance increasing? If so, are the increases independent from overall construction costs or as a result of increases in overall construction costs? (For example, increase in premiums by Surety Company versus increases in amount of total project cost on which premiums is calculated?)
- 7) Has your organization attempted to reduce insurance and bonding costs and if so how was this done and what were the results?
- 8) Could you suggest other organizations and individuals that might be interested in participating in this project?
- 9) Have you written on the subject of insurance and bonding costs for major transit construction projects? Would you be willing to submit this work for potential inclusion in the final report?

Attachment B - Potential Interview Participants

Insurance & Bonding Industries & Related Organizations

- American Insurance Association
- Florida Contractors Insurance (Construction Insurance Agent)
- Florida Security Association (Board Member) and CNA Surety
- Florida Security Association (President) and the Hartford Group
- Florida Office of Insurance Regulation
- Surety & Fidelity Association of America (President)
- Surety Information Office (Executive Director)
- Zurich North America (Senior Regional VP Construction)

Florida Transit Agencies & Other Florida Based Organizations

- Broward County Mass Transit (Construction Project Manager)
- Broward County Mass Transit (Administration)
- Central Florida Regional Transportation Authority – Lynx (Operations, Maintenance)
- Central Florida Regional Transportation Authority (Risk Management)
- Hillsborough Area Regional Transportation Authority (Risk & Environmental Safety)
- Miami-Dade Transit (Formerly with MDT currently with Miami Dade County Project Scheduling and Compliance Office of Capital Improvements General Obligation Bond Division)
- Miami Dade Transit (Contract Administration)
- Miami Dade Transit Resident Engineer (Palmetto Extension, Busway and Metromover Projects)
- Miami International Airport (Civil Environmental Engineering Division)
- Miami International Airport (Risk Management)
- South Florida Regional Transportation Authority (Engineering and Construction)

Out-of-State Transit Agencies

- Bay Area Rapid Transit (BART)
- Dulles Corridor Metrorail Project, VA Department Rail & Public Transportation
- New York City Transit (Capital Budget)
- New York Metropolitan Transportation Authority (formerly with Risk Management, currently with Allied North America)
- Third Street Light Rail Project (MUNI)

Other Stakeholders

(Transportation Consultants, Contractors Association, Professional Organizations)

- American Public Transportation Association (Research & Technology)
- American Public Transportation Association (Procurement Committee)
- Booz Allen Hamilton, Inc./FTA PMOC (Senior Associate)
- Cherokee Enterprises, Inc. (Principal)
- General Contractors of America (Federal and Heavy Construction Division & Surety)
- Federal Transit Administration
- Florida Department of Transportation
- Greenberg Traurig (Construction Law)
- URS Corporation (National Transit)
- The Madfis Group (Principal)

Attachment C - Recent Industry Developments

1. Recent article entitled, "*Hot Button Issues in Construction Accounting & Financial Management*," by Robert A. Davidson of Davidson Golden & Lundy, CPA's

In response to Hurricanes Katrina and Rita along with increasing global demands, construction supplies are becoming scarce and, therefore, more costly. Two of the six contract management procedures that Davidson recommends for contractors are as follows:

"Insurance costs will undoubtedly rise. Extended period contract bids should consider higher insurance costs in labor burden rates and other costing components."

"Now more than ever, obtaining surety bonds for suppliers and subcontractors should be a mandatory control procedure. Due to the volatility of supply and price, the bid quote is only as good as the subcontractor or supplier."

Davidson goes on to say that the surety industry reported record losses in 2004, with the largest surety reporting a loss ratio of 142 percent and almost every major surety reporting losses above acceptable ratios. The losses, when coupled with reduced insurance capital available as a result of the hurricanes, will tighten surety credit in 2006.

Davidson suggested that contractors schedule annual meetings with their financial partners, improve financial reporting, clean up financial statements and cease all unhealthy practices, and bid jobs that are a good match.

2. Recent article in the May 12, 2006 Daily Journal of Commerce: “*SBA bond changes to effect Gulf contractors*,” by Garry Boulard.

“... the U.S. Small Business Administration has announced plans to significantly streamline the application process of its Surety Bond Guarantee Program. A bedrock of the SBA since its creation in 1971, the Surety Bond Guarantee Program guarantees for small construction companies bid, payment and performance bonds of up to \$2 million. Among the changes announced by SBA Administrator Hector V. Barreto is how the agency defines what a small business is. If a business meets the North American Industry Classification System size standard within the industry in which it is working, or if the business does not make more than \$6.5 million yearly in gross receipts, the SBA now considers it as a small business. The new designation applies only to those businesses that are doing work in an officially declared disaster area in either Mississippi or Louisiana.”

3. Recent article in May 12, 2006 Buffalo Business First: “*New law (in Maryland) allows contractors to use individual surety bonds*,” by Rachel Sams

“The bill, which Ehrlich (Maryland Governor) signed into law May 2, allows contractors to submit individual surety bonds for state work. Supporters believe it will help small and minority contractors ... get the backing they need to land state projects. But the laws opponents say it could wallop small subcontractors and construction suppliers. A

surety bond guarantees that a contractor will complete a project and pay subcontractors and suppliers. All state projects costing more than \$100,000 require a bond, as do some smaller projects. Maryland previously only accepted surety bonds issued by insurance companies.”

4. American Institute of Certified Public Accountants (AICPA) Construction Industry Executive Forum, July 20-21, 2006, San Diego, California:

Friday, July 21 – “Challenges: Insurance Risk Management and the Surety Bond Market,” Mike O’Neill, American Construction Insurance Group, Inc., Dallas, Texas

Highlights of the session include: captive insurance markets; OCIPs and CCIPs; subcontractor default insurance; current surety issues; and alternative programs – captive/deductibles.

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