

PROCEEDINGS OF THE WORKSHOP ON

INTERNATIONAL TRANSIT TURNKEY AND JOINT DEVELOPMENT



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Proceedings of the Workshop on International Transit Turnkey and Joint Development

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Proceedings

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Proceedings of the Workshop on International Transit Turnkey and Joint Development

San Juan, Puerto Rico October 15-19, 1996

Sponsored by

Transportation Research Board Federal Transit Administration Puerto Rico Department of Transportation and Public Works

EXECUTIVE SUMMARY

Turnkey is a means of project development in which the owner contracts with a second party to complete a project expediently and consistent with the owner's defined requirements. Turnkey project development can take a number of forms, depending on the nature and complexities of the project and the requirements and preferences of the owner. In the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the U.S. Congress authorized the Federal Transit Administration (FTA) to undertake at least two turnkey demonstration transit projects and to evaluate turnkey as a means of developing transit infrastructure improvements.

In conjunction with five FTA-sponsored Transit Turnkey Demonstration Projects, the FTA requested that the Transportation Research Board (TRB) participate in an assessment of the transit turnkey demonstration project experience. The workshop was sponsored by the TRB, the FTA, and the Puerto Rico Department of Transportation and Public Works. The purpose of the workshop was to explore current international experience in the development of turnkey transit projects, to discuss effective turnkey practices, and to identify those aspects that warrant further consideration.

These proceedings document the sessions, addresses, and presentations that constituted the workshop. Summaries of five resource paper sessions and panel discussions are included:

- Joint Development and Finance
- Procurement
- Value Engineering / Design and Construction
- Project Control, and
- Environmental and Risk Management Considerations.

Transit turnkey and joint development are promising developments for undertaking transit projects. They require encouragement and further study. Notable features of turnkey are the elimination of the "hand-off" between project stages and the emphasis on teaming.

The turnkey approach may result in lower capital costs and fewer change orders and contract difficulties. There is a pipeline of major transit project proposals and an increasingly constrained federal budget. Transit turnkey and joint development can advance major transit investment projects in this time of federal fiscal constraint.

Turnkey requires rethinking the procurement process in order to select the best contractors given the project requirements and the owner preferences. Care must be exercised to ensure that turnkey does not reduce the contracting opportunities for disadvantaged, small, and medium-sized contractors.

ACKNOWLEDGMENTS

The Transportation Research Board Proceedings of the Workshop on International Transit Turnkey and Joint Development is the result of a strong collaborative effort by the Workshop Steering Committee, project sponsors, program speakers, workshop participants, and proceedings editor and staff.

The Steering Committee, along with expert agency liaisons, developed an innovative and "hands-on" workshop, which was very well received by workshop participants. Under the strategic vision and guidance of Alan F. Kiepper, Chair, the entire committee played an important role in designing and conducting the workshop process.

Project sponsors provided considerable financial and staff resources that helped to make the event a success. Special thanks are due to: Gordon J. Linton—Administrator and Edward L. Thomas—Director, Office of Planning Innovation and Analysis, Federal Transit Administration of the U.S. Department of Transportation for initiating the project; Dr. Carlos I. Pesquera—Secretary, Dr. Carlos A. Colon—Deputy Secretary, and Lourdes Perez—Communications Director, Puerto Rico Department of Transportation and Public Works for on-site workshop support; and Dr. Lewis P. Clopton—Director, National Center for Transportation Management, Morgan State University, for editing the proceedings. Of special note is the fact that a major hurricane swept the island of Puerto Rico about three weeks prior to the meeting thereby making the event a truly unique challenge.

Six resource papers were prepared for the Workshop addressing the core subjects of Financing, Project Management and Control, Identification and Management of Risk, Value Engineering and Quality Assurance/Quality Control, Procurement, and Environmental Considerations. The Steering Committee and sponsors are very appreciative of the resource paper authors for developing a solid technical foundation on these major workshop themes.

Lastly, please note that the full text of the resource papers prepared for the Workshop has been published by the Federal Transit Administration in a companion volume to these *Proceedings:*

Lessons Learned— Turnkey Applications in the Transit Industry (Washington, DC: Federal Transit Administration, U.S. Department of Transportation, October 1997).

For information on how to obtain a copy of this volume, please contact the Office of Planning Innovation and Analysis, Federal Transit Administration, U.S. Department of Transportation, 400 Seventh St., SW, Washington, DC 20590.

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INTRODUCTION

Turnkey is a means of project development in which the owner contracts with a second party to complete the project expediently and consistent with the owner's defined requirements. Turnkey project development can take a number of forms depending on the nature and complexities of the project and the requirements and preferences of the owner. In the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), the U.S. Congress authorized the Federal Transit Administration (FTA) to undertake at least two turnkey demonstration transit projects and to evaluate turnkey as a means of developing transit infrastructure improvements. Since 1992, the FTA has invested in five turnkey demonstration projects:

Baltimore (extension of the light rail transit system)

 San Juan, Puerto Rico Tren Urbano (new rail systems development)

 Hudson-Bergen, New Jersey Line (new light rail transit system)

Bay Area Rapid Transit District extension to the San Francisco International Airport, and

Los Angeles Union Station Gateway Center.

In conjunction with the five Transit Turnkey Demonstration Projects, the FTA requested that the Transportation Research Board (TRB) participate in a dicussion of the transit turnkey demonstration project experience. The workshop was sponsored by the TRB, the FTA, and the Puerto Rico Department of Transportation and Public Works. The purpose of the workshop was to explore current international experience in the development of turnkey transit projects, to expose what is working with turnkey, and to identify those aspects that warrant further consideration.

The International Transit Turnkey and Joint Development Workshop was held in San Juan, Puerto Rico between October 15 and 19, 1996. Experts presented their experience, research, and observations concerning transit turnkey projects around the world. At that time there was a minimum of 58 turnkey transit projects under development throughout the world. These proceedings document the sessions, addresses and presentations that constituted the workshop. Summaries of five resource paper sessions (See, Lessons Learned-Turnkey Applications in the Transit Industry- Washington, D.C.: U.S. Department of Transportation, Federal Transit Administration, October, 1997) and panel discussions are included.

- Joint Development and Finance,
- Procurement,
- Value Engineering/Design and Construction,
- Project Control, and

 Environmental and Risk Management Considerations.

The Opening Session included keynote addresses by the Honorable Pedro J. Rossello, Governor of Puerto Rico; Gordon Linton, Administrator of the Federal Transit Administration (U.S. Department of Transportation); and Pierre Laconte, Secretary General of the Union International des Transportes.

Turnkey, while not new, is an important departure from the conventional approach utilized during the past thirty years to undertake transit infrastructure projects in the United States. In the conventional approach, the owner—typically a public transit agency, conceived the project, competitively solicited and contracted with one or more engineering/design firms to design the project, and then, through an independent competitive bid process, eventually contracted with a consortium for the construction, vehicle manufacture and supply, and systems support. At the end of this process the owner integrated the various project components into an operating transit system.

In turnkey project development, at a minimum the design and build (design-build) stages are integrated into a single procurement and completion contract. While the contracting organization may be a consortium or partnership of companies, the single design-build procurement considerably expedites the project development process. In most states, design-build public procurements must be legislatively enabled. Other forms of turnkey procurement include superturnkey (designbuild-operate), build-operate-transfer (BOT) and buildtransfer-operate (BTO). Mr. Carlos A. Colon Deputy Executive Director Highway and Transportation Authority Puerto Rico Department of Transportation and Public Works San Juan, Puerto Rico

-opened the workshop with a congenial welcome and preliminary introductions. He introduced the Workshop Chair,

Alan F. Kiepper, Chair of Workshop Steering Committee Senior Vice President of Parsons Brinckerhoff Quade and Douglas, Inc. New York, New York

Mr. Kiepper introduced the members of the Workshop Steering Committee and others who had worked to make the workshop possible. He referred to his tenure as the General Manager for the Metropolitan Atlanta Rapid Transit Authority (MARTA) twenty-five years previously, during the time that MARTA was developing the Atlanta rapid transit system. At that time, the conventional approach to major transit projects included a public definition and conception for the project, with the design and specifications usually developed by a firm in instances where the public agency was inexperienced. Construction (and manufacture) was by contractors selected in sealed bid procurements with the public agency/owner responsible for the operations. Financing was typically a combination of federal, state, and local sources. The Bay Area Rapid Transit System (BART) and the Washington Metro were executed in a similar fashion.

The speaker noted that in the current era of public fiscal constraint, alternative means of undertaking large transit projects are being investigated. These alternate approaches involve innovative means of conceiving, designing, constructing, operating and financing these projects. It is possible that even ownership may be private.

Reflecting on the early 1900's when the New York City subway was built, Mr. Kiepper recalled that it was a private investor—August Belmont, who constructed the system. Mr. Belmont operated the system and maintained a five-cent fare until the 1940's when the City of New York under Mayor Fiorello LaGuardia took ownership of the system. Continuing to reflect on transit through the 1950's, the speaker observed that most transit systems were privately built and operated in what is now known as turnkey project delivery.

He observed that many things occur in cycles. In the case of transit, it is appropriate to consider the present cycle of privatization and to learn how to utilize turnkey approaches for this generation of transit investments.

The audience was encouraged to participate in the workshop to stimulate the exchange of experience, knowledge and practices. The steering committee planned the meeting as a workshop, rather than as a conference, to engender audience participation. In closing, Mr. Kiepper acknowledged the following which he attributed to a Maryland legislator:

"The moment of excited curiosity is the opportunity for knowledge."

INTERNATIONAL VIEWPOINT: TURNKEY AND JOINT DEVELOPMENT

Pierre Laconte, Secretary General Union International des Transportes Brussels, Belgium

Mr. Laconte noted that a survey of international transit developments reveals substantial numbers of turnkey projects and joint development experiences. For this workshop he applied the following criteria to selected cases for consideration:

A minimum one hundred percent fare box recovery ratio;

 The private sector assumption of one hundred percent of the operating risk;

 High levels of auto ownership, as is characteristic of the United States.

Applying these criteria resulted in many international examples of very successful turnkey transit projects. Among these are the Istanbul, Turkey Light Rail Line (possibly the most successful LRT in the world); the Hong Kong Twin Moon Line which exemplifies high fare box recovery and very successful property profits; and several examples of recent French projects involving public-private partnerships and urban renewal. In these instances, the degree of fare box recovery could not be documented adequately for further consideration.

Mr. Laconte said that recent institutional developments in Great Britain, notably the 1986 deregulation of the nation's transit industry, provide the means to verify the fare box recovery of privatized systems. As a consequence of the 1986 deregulation, approximately seventy-five percent of transit services are currently provided through private entities and twenty-five percent through public agencies. There are confirmed examples of one hundred twenty percent fare box recovery of recently privatized systems in Britain. The British deregulation provides an environment favorable to private sector involvement in transit, without the downside of inadequate services to marginal markets. This is achieved by allowing individual lines to be contracted with private entities through a bidding process. Where no party bids to operate a line without subsidy, lowest subsidy bids are tendered and contracted.

The British deregulation has achieved extraordinary success with management and employee takeovers of existing systems and lines. Financial backing is provided by banks and other financial institutions. Three examples were selected by Mr. Laconte for consideration:

The Greater Manchester Metrolink;

- The London Subway Northern Line renewal, and
- The Croydon Light Rail in London.

The Greater Manchester Metrolink is a twenty mile light rail project involving the reuse of existing abandoned track with some on-street segments. In 1989 the Manchester Transit Authority bid the project as a build, operate and maintain project. The performance specifications were general and involved architectural utility, time of service, availability performance, and reliability performance. Non-compliant bids were encouraged. There were no vehicle specifications. As contracted in 1990, the successful private consortium provided \$10 million (U.S.) or fifteen percent of the total investment and assumed full operating risks for fifteen years. The total bid cost was \$200 million. In the fourth year of the agreement, the consortium experienced a one hundred percent fare box recovery and a \$5 million operating profit. The transit authority in 1996 exercised an escape clause available to both parties in the original agreement. The transit authority is rebidding the project to extend the network and to provide terms more favorable for the authority.

The London Subway's Northern Line renewal was bid by the London Underground for manufacturers to design, build and maintain a fleet of trains for twenty years. An unfavorable government disposition relative to transit projects necessitated the privatization of the line's renewal. After fifteen years, the train fleet reverts to the manufacturer at a price fixed in the contract. The bid specifications were general and emphasized performance specifications including the number of service hours, reliability, availability of rolling stock and the mean downtime for failures. Payments were exclusively for service with financial incentives to the manufacturer to maintain an adequate car fleet reserve. Agency workshops were transferred to the manufacturer for the period of the agreement. The London Underground remains totally responsible for the operations of the line. The Underground operates each of its lines as a decentralized performance center with each line manager fully responsible for the total performance of the line. For the year 1994-95 the London Underground had a system surplus equivalent to \$250 million (US). That surplus does not include bus operations which were privatized and sold for a surplus of \$200 million.

The Croydon project involves an agreement between the London Transport Agency, several municipalities, and a private consortium for the consortium partnership to design, build, operate and maintain the Croydon Light Rail Line (CLRT). The CLRT services Croydon, a suburb of London, and has a \$300 million project cost, including a \$40 million private tract owner payment. The evolution of the project involved informal consultations between the public agencies and a number of private companies involved in transport operations, manufacture and civil engineering. The informal consultations resulted in a project development group (PDG) involving one firm from each of the aforementioned categories to develop the performance specifications, design and the terms of the concession. It was agreed that if the PDG partners were not successful in bidding the project they would be compensated for the costs they incurred during project development. The successful consortium, which did not include all the PDG participants, will invest \$125 million (40 percent of the capital) and is taking full responsibility for the operations of the CLRT. These agreements were reached in July 1996. The success of the chosen consortium can be attributed in part to their use of an existing vehicle, which was facilitated by performance specifications which did not specify a vehicle.

Several other successful public-private partnerships were briefly considered. Mr. Laconte highlighted a number of reasons for the success of these turnkey and joint development projects noting:

Important roles for the authority include: defining which risks are to be taken by the private sector (especially the safety requirements); design and marketing studies; assembling a talented negotiating team, and gaining public support.

 General performance specifications and uncomplicated project requirements.

• Orient services to the user and incorporate multimodality to enhance the users convenience.

Clearly define boundaries and flows of income.
Incorporate a single ticket acceptable for all operators

 Keep private participants independent from public sector practices, liabilities and restrictive trade practices.

The operator must be involved from the beginning of the project.

There must be equal public and private talent levels involved in the negotiations.

A change of culture is required to implement all of the prerequisites.

WELCOMING REMARKS

Dr. Carlos I. Pesquera, Secretary

Puerto Rico Department of Transportation and Public Works San Juan, Puerto Rico

Dr. Pesquera discussed how Tren Urbano reached its current status. He noted the assistance offered by the Administrator of the Federal Transit Administration, Gordon Linton, and the FTA staff in bringing Tren Urbano into reality. The Secretary indicated the importance of community participation in developing a strong local momentum in support of the project. These supporters of the project were especially important, according to the Secretary, because there were many significant impediments in the early stages. A considerable detraction was the absence of a track record in large scale rapid transit project implementation. Absent these project champions, the Secretary was doubtful the project would have advanced as far as fast and as well.

Gordon J. Linton, Administrator Federal Transit Administration U.S. Department of Transportation Washington, D.C.

The Administrator opened by recognizing that nineteen new start projects had received full funding grant agreements since January 1993. In acknowledging the Federal government's continued commitment to transit, attention was called to the policies undergirding that continued commitment.

Transit Oriented Policies and Development

Mr. Linton discussed the importance of comprehensive planning to the success of transit infrastructure investments and the responsiveness of these investments to the common desires of a broad national cross section of urban stakeholders. The common desires, as revealed in Visual Preference Surveys conducted throughout the United States, included:

- compact communities
- open space
- green lands and

pedestrian oriented development with adequate street lighting.

The importance of active community involvement in the planning and decision making processes leading to the implementation of transit infrastructure investments was emphasized. Examples were cited from Corpus Christi Texas.

Transit supportive plans and policies were examined relative to their importance in achieving the success of the project and leading to the realization of livable communities. These plans and policies included:

 mixed use developments complementing passenger station and terminal areas,

• the implementation of traffic signal preemption and coordination to minimize delays to light rail systems operating in mixed traffic,

 on-site amenities and services (e.g., dry cleaning, day care, commercial facilities) in station complexes, and

transit and pedestrian access coordination.

Examples were drawn from successful international and domestic urban transit systems including Cedar Rapids Iowa, Portland Oregon and Asian and European transit systems.

Mr. Linton indicated that future Federal investments in transit infrastructure would emphasize and benefit those communities where comprehensive policies consistent with transit success and livable community objectives were encouraged.

Joint Development

The importance of deficit reduction and balancing the budget was discussed, along with the increased requirement for federal transit investment effectiveness. Joint development was introduced as a means to capture and to leverage the benefits resulting from access to transit infrastructure finance and further enhance the transit infrastructure. The historic evolution and refinement of Joint Development was discussed, beginning with the Urban Mass Transit Act of 1966, its expansion in the Urban Mass Transit Act of 1974, and resulting in the Intermodal Surface Transportation Efficiency Act of 1991 with an emphasis on the preservation of urban transit corridors.

Joint development was presented as a means to use Federal real estate investments to generate added revenues for transit infrastructure. The primary instruments of joint development as discussed included:

- sale or lease of air rights
- benefit assessment fees
- equity partnerships

- zoning bonuses
- leasing arrangements

Case studies illustrating these approaches were discussed in the Washington, D.C. Metro, the Miami PRT and the Los Angeles Gateway projects.

Mr. Linton went on to consider the policies which FTA was currently pursuing to promote joint development as a transit infrastructure resource. These policies were:

Eliminating barriers to joint development such as the property disposition rule. Mr. Linton indicated that FTA was going to conduct a pilot assessment in which the property disposition rule would be relaxed on projects in Washington, D.C. and Baltimore, Maryland.

 Documenting the best practices concerning transit joint development projects.

Updating FTA planning and project development guidelines to promote joint development as an element in project evaluation and implementation.

Considering legislative changes to address the payback provisions of the common grant rule.

The Administrator emphasized the need to leverage Federal transit investments through the use of public-private joint developments. He noted that in his travels through Asia, he was impressed with the extent to which joint development contributes to the cost recovery and income from transit infrastructure investments.

Turnkey Project Delivery

Administrator reviewed the Intermodal Surface The Transportation Efficiency Act of 1991 and the Congressional instruction for FTA to consider the Turnkey Project Development process as a means to save time, reduce project costs, and encourage the development of technology in transit infrastructure projects. The Congressional mandate for the five FTA Turnkey Demonstration projects was discussed as an effort to monitor and document the performance transit turnkey demonstration projects. Turnkey was defined as a process by which infrastructure projects were procured to include their design, construction, and sometimes operation as a single procurement. Mr. Linton highlighted the importance of assuring the participation of small, mid-sized, minority, and disadvantaged businesses in turnkey procurements and project development processes.

The importance of time and cost savings as factors in turnkey project development were considered. Mr. Linton recognized the dependence of those performance factors on the management of the risk, schedule and project control for the project. It was recognized that turnkey offered the potential to achieve innovations in the finance and technologies of transit infrastructure projects.

The management and the allocation of risks between the public owner and the private contracting parities was mentioned as an important procurement consideration. The Administrator noted that FTA had recently revised its "Third Party Contract Guidelines" to encourage and facilitate the development of turnkey projects. He further noted that in March 1996, President Clinton signed the Federal Acquisition Reform Act of 1996, explicitly endorsing the turnkey approach for Federal infrastructure construction projects.

The Administrator observed that turnkey development encouraged the participation of the private sector in the finance of public infrastructure projects. The importance of broad industry participation was recognized, beginning with full and open competition. The concerns of small and minority businesses were recognized particularly as related to bid shopping by prime contractors subsequent to their selection. Mr. Linton referred to the FTA policy that small and minority business subcontractors must be identified during the prequalification and request for proposals stages of the turnkey procurement. It was reported that BART had been very successful with the prequalification identification of small and minority business enterprises in the San Francisco Airport Extension turnkey demonstration project.

Mr. Linton closed by emphasizing that transit infrastructure investments were vital and important to the nation's well being. Joint development was acknowledged as an impetus to leverage federal infrastructure investments with coordinated private and public facilities and developments. In achieving the potentials for transit investments the public expected that transit:

be safe and secure

 achieve high standards of quality assurance and quality control

demonstrate effective partnerships involving the public and the private sectors

be cost effective

achieve broad based participation from the public and private sectors

Honorable Pedro J. Rossello Governor of Puerto Rico San Juan, Puerto Rico

Governor Rossello extended the Puerto Rican government's warm welcome to the Workshop participants. He reviewed the accomplishments during the previous four years in improving the Commonwealth's infrastructure and introduced plans for the next four years. Over the next four years, Puerto Rico's goal is to achieve a world class transportation system, defined as:

- an adequate and well maintained infrastructure
- intelligent intermodal operations

environmentally sound and socially responsive development

The Governor observed that an adequate infrastructure was essential to economic development. The development of an adequate infrastructure requires a public/private partnering as exemplified by the 1993 Infrastructure Council's Strategic Plan which proposed \$2.6 billion in surface transportation projects. An impressive list of transportation projects was announced totaling \$1 billion completed or under development by 1997, with half of this amount being for transit improvements.

The Governor continued noting that about a third of the island's population, and more than a third of its jobs, are located in the San Juan metropolitan area. Eighty per cent of the jobs in the San Juan region were in the urban core where densities are comparable to Manhattan. The San Juan metropolitan area consists of thirteen municipal governments within an area of approximately 400 square miles. Congestion mitigation was recognized as a priority concern.

Stressing the importance of traffic operational improvements and road infrastructure maintenance for congestion relief, the Governor noted that over the next 15 years the San Juan area expects a twenty percent growth in population and a forty-five percent growth in person trips per day, above the current 3.2 million person trips per day. The highway and road systems cannot be expanded sufficiently to accommodate this projected growth. San Juan transit, Tren Urbano, is vital to the development of an intermodal transportation system to maintain the region's mobility and economic development. The Governor repeatedly stressed the importance of an integrated intermodal regional transportation solution for the San Juan region with Tren Urbano as the backbone to optimize intermodality.

In his remarks, the Governor expanded on the requirement for intermodalism by noting that half of Tren Urbano's riders would access the system's stations by bus and taxi (publico). He observed the importance of safe and attractive access, and coordination and integration of the modes. The efforts now under way to reconfigure the bus route system to achieve intermodal coordination and integration in conjunction for Tren Urban was described. Continuing, Governor Rossello discussed the expansion of the express bus system and the transit system architecture designed around thirteen transit centers to serve as the hubs for interline transfers. He also referred to his administration's goal for a world class transportation system, noting that the transportation system had to be intelligent with bus and street traffic signal coordination and passenger information systems. The January 1994 opening of the Puerto Rico Highway and Transportation Authority's Transportation Control Center was recognized as well as efforts currently under way to plan for San Juan's Intelligent Transportation System.

The third requirement in the Puerto Rican government's objective for a world class transportation system was a system which is environmentally sound and socially responsible in design and development. In achieving these goals, the need to optimize community participation and to create opportunities for social development and economic growth were cited. Achieving society's environmental goals was recognized as a priority. It was acknowledged that growth and the environment must be balanced in Puerto Rico, where land is limited in supply. The Governor considered a number of specific instances where environmental preservation and mitigation were integrated into transit system projects.

Governor Rossello also described Quality of Life Transit Enhancements that have been pioneered in Puerto Rico. These include making beach access and safe ocean surfing accessible to persons in wheelchairs.

In Tren Urbano, the Governor acknowledged the exemplary efforts to achieve community participation in station area planning. Residents and communities near stations have been actively engaged in station area planning with the result that ninety-four percent of station area residents approve the project.

Further expanding on the environmental, social and economic attributes of the project, the Governor discussed its urban redevelopment and urban growth attributes. While accepting the short term impetus of the \$1.2 billion Phase 1 Tren Urbano implementation (e.g., \$ 800 million in earned income), the Governor stressed that Tren Urbano's primary benefits were large scale redevelopment and community regeneration. In particular, the Governor expected that as a consequence of Tren Urbano, the livability index and the quality of life for residents of the San Juan metropolitan region will significantly improve.

Considering the urban development and community redevelopment potentials of the Tren Urbano project, Governor Rossello discussed a number of Tren Urbano Phase One station sites and the related urban development/station area developments that were planned in conjunction with Tren Urbano. In particular, a number of large and moderate scale joint development projects were discussed with an emphasis on how they complemented the surrounding area development and acted as a catalyst in the achievement of development and redevelopment master plans.

The Governor's remarks concluded with a preview of the presentation which the Commonwealth had planned for the Year 2004 Olympic Site Selection Committee (scheduled to visit Puerto Rico in November 1996). The Commonwealth's Olympic Game Bid is predicated on the World Class Infrastructure and transportation system of which the Tren Urbano full implementation is a central and essential component. Session 1: Joint Development and Turnkey Finance – A Contrast of Paradigms Part 1: United States Experience

Session Chair:

Dennis J. Newjahr Director, Strategic Business Planning Los Angeles County Metropolitan Transportation Authority Los Angeles, California

Session Highlights:

• Explored alternative definitions of joint development with definitions ranging from those which focus on public sector receipt of revenues or reductions in cost to those with an emphasis on private sector contributions to community integration.

Discussed benefits of development highlighting ridership and revenue increases, local tax generation and implementation of local and regional land use plans and policies.

= Identified obstacles to implementation of joint development efforts noting the presence of conflicting objectives, strengths and weaknesses of negotiating parties, difficulties associated with integrating the needs of multiple governing jurisdictions, institutional barriers within transit agencies and other public institutions, and a lack of financial flexibility.

To overcome these challenges, the presenters noted the importance of careful initial planning, clear identification of goals and objectives, careful understanding of the real estate development market, clear definition of the authority of public agencies, and flexible financial approaches ranging from a governmental willingness to purchase additional right of way and make baseline infrastructure investments to governments use of turnkey techniques to facilitate initial private sector investment in site preparation.

Explored the financial opportunities and challenges posed by turnkey procurements and real estate development.

Speakers noted the difficulties associated with vendor financing in the United States, highlighting the financial benefits associated with government issuance of tax exempt debt, state and federal procurement restrictions, and transit's traditional inability to generate revenues sufficient to cover capital and operating costs while also generating a sufficient level of return. Presenters noted the ability of turnkey to shorten time frames and thus reduce inflation risk, debt service requirements, and management costs.

• When taking the form of a concession agreement the private sector has an interest in investing in revenue generating opportunities if sufficient time is provided to amortize associated capital investments.

• Speakers discussed individual projects and associated financial arrangements, though it was noted that legal restrictions prevent the United States from availing itself of the full spectrum of ownership and investment options that are available elsewhere.

Dennis J. Newjahr

Director, Strategic Business Planning Los Angeles County Metropolitan Transportation Authority Los Angeles, California

Mr. Newjahr noted that public/private partnerships have been a proven means of advancing technology for hundreds of years. Though the concept is not new, the process has become more complicated through time.

A working definition of joint development was offered to help structure the discussion. The suggested definition included new telecommunications technologies as well as traditional land development. It was grounded in the concepts of cost sharing and revenue sharing in which the private sector reimburses transit agencies for the value created by the location of a transit facility. Reimbursement can be either a direct payment or through the sharing of costs.

Andrew C. Cotugno Transportation Director Portland Metro Portland, Oregon

Mr. Cutugno suggested that the definition of joint development be broadened to consider the public and private sectors working together in integrated efforts to achieve and maintain livable communities in which transit contributes an important role. The importance of the relationship between metropolitan growth management and transportation planning was highlighted using the Portland, Oregon experience to demonstrate the connection.

In outlining the land use and planning context in Portland, Mr. Cutugno noted that growth management and transit have been important tools in accommodating a 40 percent growth in population while sustaining the livability of the community. The administrative framework for this planning effort lies in the creation of the Portland Metro, a regional planning organization incorporating 24 municipal governments and three counties. Metro is a separate level of government, governed by an elected council with statutory authorized taxing, growth management and transportation planning powers, and operational responsibilities. Acting consistent with an authorizing charter, Metro developed a Framework Plan and has authority to ensure that municipalities act consistently with this plan.

The goal of this plan is to ensure compact urban area within defined urban growth boundaries. The plan provides for very strict limits on what can occur outside of these boundaries. Land use requirements established within the Framework Plan are to be incorporated in municipal ordinances and zoning regulations.

The goal of this effort is to sustain a livable community by maintaining compact growth within the urban region. The emphasis is in facilitating infill development within approved areas. Transit corridors have been used as tools to achieve this vision, driving density, and providing for the targeting of public and private investment. The fights in Portland, therefore, are about the drawing of these boundaries. Activities within these boundaries, if consistent with the Regional Plan, are much less controversial with building permits issued within 120 days.

In profiling Portland's light rail transit corridors, Mr. Cotugno noted their location within the defined urban growth areas. He also noted the accompanying targeting of development adjacent to these corridors. In discussing the Gresham and Lloyd district projects, he highlighted the increased development densities around transit stations and the different levels and types of government support necessary to leverage this investment. He also noted the state policy decision to locate state offices and government services in downtown areas adjacent to transit.

Leveraging investment adjacent to stations requires that the transit agency know its market. The agency must understand area demographics, real estate values and lease rates sufficient to calibrate what it will take to encourage development. Market conditions directly influence the public sector's ability to capture any value created. Where the market is soft, benefit assessments are likely to chase developers away to alternate sites.

The goal of livability was further emphasized, with Mr. Cutugno noting that density helps to generate transit riders and to keep the agency in business. The result is that agencies should be willing to invest small amounts to leverage activity and generate the required development densities. This investment can take the form of up front capital contributions or the delivery of turnkey improvements through which the developer makes the up-front investment with subsequent governmental contributions. To achieve this, Mr. Cotugno also recommended that government be willing to purchase additional right-of-way to control outcomes and to generate revenues for reinvestment elsewhere.

Alvin McNeal Joint Development Manager Washington Metropolitan Area Transit Authority Washington, D.C.

Mr. McNeal profiled WMATA's joint development program. Like Mr. Cotugno, Mr. McNeal noted the need for cooperation among numerous jurisdictions. In the case of WMATA, he noted the differing political and development cultures of the States of Maryland and Virginia, the District of Columbia, and the unique role of the Federal government in the process.

Mr. McNeal discussed joint development and noted the synergy required to generate ridership and decrease the costs of operating and maintaining a transit system. He profiled WMATA's joint development efforts noting the traditional emphasis given to ground lease transactions. FTA's tradition reimbursement requirement associated with the sale of lands purchased with federal moneys was discussed. This has impacted the feasibility of land sales, though WMATA is pursuing such opportunities along with those involving investor equity and land swaps.

In defining WMATA's development goals, Mr. McNeal noted that implementing local land use policies was just one goal. Others include generating ridership and fare revenues for the agency, and development related tax revenues.

WMATA has implemented two types of development projects: mixed use projects on air rights (ground leases) and, free standing projects connected to transit stations by passageways or easements (connection agreements). WMATA has eleven air rights and eleven easement projects which have generated \$50 million in rental income to date. It also has received \$15 million associated with the sale of its land. These projects are estimated to generate 15,000 daily riders, 5,000 jobs, and \$20 million in local tax revenues.

Mr. McNeal noted the challenges faced in the implementation of a joint development program. These included:

 conflicting objectives between the transit agency, the developer, lenders and local community groups;

- the absence of supporting land use policies by the municipalities within which stations are located;
- institutional barriers within transit organizations;
- poor market support and;
- a lack of financial flexibility associated with the

limited ability of transit agencies to dispose of lands purchased with public funds.

In discussing how to tackle these challenges, Mr. McNeal stressed the need to:

pay careful attention to the financial details of a deal;

 understand and think through the internal agency review process. Limit the number of steps;

understand allowable uses at the site, document zoning and assess the impacts of proposed uses;

 be clear on what you are offering, understanding site encumbrances;

be clear on what the transit agency can offer -- focus on the powers of the agency and the tools and strengths that the public and private actors each bring to the table and;

 pay careful attention to public sentiment around station areas and do not underestimate the need for leadership and a project champion.

Dennis J. Newjahr

Director, Strategic Business Planning Los Angeles County Metropolitan Transportation Authority (LACMTA) Los Angeles, California

Mr. Newjahr's discussion focused on the Union Station Gateway Transit Center and LACMTA's Headquarters facility in Los Angeles, California. He discussed aspects of the project and the working relationship between the LACMTA and Catellus Development Corporation (Catellus).

The Gateway Center consist of an intermodal transit center and a 26 story, 628,000 gross square foot administrative headquarters building for the LACMTA. The Gateway Center is strategically located behind the old Union Station, within a 68 acre Los Angeles area known as the "Alameda District," approximately one mile from the center of downtown Los Angeles. The location of the Gateway Center makes it a convenient and attractive downtown activity center.

Joint development activities will also help to defray the capital construction and on-going maintenance and operation of the Gateway Center. Future development projects planned for the parcels surrounding the Gateway Center will pay a fair share allocation of site amenities that will provide benefits to building owners and occupants. Revenue generation from uses such as retail areas and parking operations will contribute to the capital and operating expenses associated with the planned development.

The Gateway Center was designed and constructed pursuant to a Development Agreement executed by and between the LACMTA and Catellus, under the joint development authority granted to the LACMTA by the state. The total cost of the Gateway Center project was \$295,000,000. It was funded over a five-year period under a complex arrangement of federal, state, and local resources. Construction of the Gateway Center began in February 1993 and it was completed in October 1995.

Following selection of Catellus as LACMTA's joint development partner, the LACMTA began to investigate traditional private development approaches for delivery of the intermodal transit center and the LACMTA's administrative headquarters facility. Negotiations were conducted with Catellus to consider a design-build turnkey approach. They created an entity that would act as the Design-Builder. This entity is known as Union Station Gateway, Inc.

USG is a non-profit public benefit corporation formed under California law. USG is made up of two members, the LACMTA and Catellus, each of which appoints three Directors to the six-member Board of Directors.

Although USG includes officers and board members drawn from the public and private sector, a strict, legally binding contract requires that the day-to-day construction management be carried out by Catellus. The contract requires the construction of the Gateway Project by the selected builder—Charles Pankow, Inc. The LACMTA employees and Directors act as owner representatives. Three contractual agreements govern the relationship between the owner, design-builder and the members of USG. Additional contracts govern the relationships between USG and the contractors, architects, and consultants who round out the project team.

• The "Design and Construction Agreement" executed by the LACMTA and USG sets forth the relationship between the LACMTA as owner and USG as design-builder.

The "Project Control Agreement" executed by USG and the LACMTA, established the LACMTA as USG's independent consultant for the purpose of carrying out various tasks that were assigned to USG under the Design and Construction Agreement, primarily relating to project oversight.

• The "Construction Management Agreement" executed by USG and Catellus, required that Catellus manage all aspects of the design and construction of the project. Exceptions are those limited aspects retained by the LACMTA as owner pursuant to the Design and Construction Agreement or transferred to the LACMTA pursuant to the Project Control Agreement.

The Design-Builder/General Contractor Contract Agreement passed on USG's obligation to obtain performance and payment bonds to the construction entity. However, it permits the constructor to acquire the bonds separately (and consecutively) for each element, reducing the risk and cost of bonding to a manageable level for the contractor.

Although USG will dissolve upon completion of construction, private sector property management of the Gateway Center will continue. To integrate the public parking facilities of the Gateway Center with private parking, a reciprocal easement agreement requiring common maintenance and use of a single management entity across the site was negotiated.

Initially, Catellus will be retained as property manager for the facilities and common areas. The LACMTA retains significant rights with respect to management, including the right to retain separate management for the LACMTA headquarters.

The net effect of the USG structure was to allow USG to function as a private developer. The private participants (i.e., Catellus, the constructor and the architects and consultants) undertook the day-to-day construction, management and design responsibilities required to keep the project and cost on schedule and in conformity with the construction documents.

The public participants (i.e., LACMTA staff acting on behalf of the LACMTA, and public sector officers of USG)

undertook the control and oversight roles, ensuring that the LACMTA's particular specifications were met on a general level, but without duplicating or interfering in the functions performed by the private sector. USG involvement permitted the LACMTA a streamlined involvement in the day-to-day issues affecting the project so that the LACMTA as owner could be responsible without being obstructionist.

By providing multiple fixed-price contracts, the segmented turnkey approach shifts the risk of performance and cost overruns away from the public sector, but did not overload private sector participants. The involvement of the LACMTA as a participant in USG allowed the LACMTA to impose all development duties, including cost control, schedule and design requirements on the design-builder. What made it work was the LACMTA's ability to act as a funnel breaking the risks and duties into pieces considered manageable by the private sector participants.

In closing, Mr. Newjahr noted the essential elements of creativity in all complicated real estate investments. He discussed the need for agreements to serve as clear road maps giving subsequent users a clear understanding of the roles and responsibilities of the parties.

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Session 1: Joint Development and Turnkey Finance - A Contrast of Paradigms Part 2: International and Private Sector Experiences

Session Chair:

Dr. Carlos A. Colon Deputy Executive Director Puerto Rico Highway and Transportation Authority San Juan, Puerto Rico

The afternoon session explored the financial opportunities and challenges posed by turnkey procurements and real estate development. Speakers identified the difficulties associated with vendor financing in the United States, noting the financial benefits associated with government issuance of tax exempt debt, state and federal procurement restrictions, and transit's traditional inability to generate revenues sufficient to cover capital and operating costs while also generating a sufficient level of return. Presenters noted the ability of turnkey to shorten time frames and thus reduce inflation risk, debt service requirements, and management costs. When taking the form of a concession agreement, it was also noted that the private sector has an interest in investing in revenue generating opportunities if sufficient time is provided to amortize associated capital investments. Finally, speakers discussed individual projects and associated financial arrangements, though it was noted that legal restrictions prevent the United States from availing itself of the full spectrum of ownership and investment options that are available elsewhere.

Roger Figura KMPG Peat Marwick London, England

Mr. Figura presented a paper on *"Turnkey Financing for Public Infrastructure Projects"*. The paper emphasized that a primary benefit of the turnkey project approach is the acceleration of the project schedule to achieve timely project implementation. The aggressive scheduling creates revenue requirements to match construction draw-downs. Revenue requirements are generally not achieved through traditional funding which features yearly allocations under an FTA Full Funding Grant Agreement, matched with local share funds. While the sources of funds may not differ from traditional transit procurement, e.g. local option taxes, state grants, etc., the financing mechanisms must be structured to access larger amounts of capital in a compressed time frame.

The parties involved in turnkey financing include the sponsoring government agency(ies), an equipment manufacturer, a general contractor and associated professional firms. Financing turnkey has the potential to bring the financial capacity of the private contractor into the process.

Mr. Figura proposed that the turnkey contractor is more likely to participate in construction financing then in permanent financing (see FIGURES 1 and 2). The turnkey arrangement must offer revenue opportunities for activities beyond transit (e.g., real estate development opportunities, toll facilities) to entertain private financing. Turnkey impacts the financing mechanisms which can be used to achieve the proper balance between the construction schedule and the available funds to meet construction draw-downs. Financing mechanisms are used both to create access to capital and for credit enhancements to reduce the cost of capital. They include:

- revenue bonds
- tax exempt commercial paper
- leveraged leases/ certificates of participation
- cost sharing
- letters of credit
- state infrastructure banks

 credit enhancement, e.g. provide financing for a debt service reserve fund.

The primary revenue sources to support financing will continue to rely on non-operating resources augmented by benefit capture tools. Benefit capture opportunities, in the form of joint development, to promote revenue and/or cost sharing, exist at rail stations, bus transfer facilities, intermodal terminals and fringe parking facilities.

Financial risk relates to the basic economics of the project to amortize debt and meet operating costs. Financial risk is managed through securing a full funding grant agreement from FTA. and putting local nonoperating revenue sources in place. Political risk refers to the interaction of the project with its community environment and the effect this interaction has on project costs. It is best understood in the context of continuous opposition which slows project implementation thereby increasing the project costs. Authorization and appropriation risk refer to the fact that there are not guarantees that authorizations will continue from one Congressional Act to another, and that appropriations will be sufficient on a yearly basis to satisfy outstanding full funding grant agreements. These risks are managed, to the extent possible, by a contingent commitment by FTA to continue grants pending new authorization of Title 49 and Title 23.

The FTA process is not well suited with respect to funding turnkey. The available funds to meet full funding grant agreements become stretched over a number of projects which adversely impacts project financing. A major issue with turnkey is the point in the FTA process when the local sponsor proceeds with a turnkey rather than a conventional procurement. Five FTA Turnkey Demonstration projects were reviewed. Two of the projects are considering a tax exempt commercial paper program to match revenues to construction costs. A third is using a mix of long-term revenue bonds and certificates of participation, a fourth is soliciting private financing, and the fifth project is using payas-you-go financing.

Several conclusions have been derived from the international experience with conventional and turnkey transit projects. A comparison of turnkey projects in the U.S. and abroad demonstrates that the turnkey/design-build approach has been utilized more frequently outside of the United States. This results from several factors, including:

availability of inexpensive tax-exempt debt financing in the United States for public infrastructure investments; extremely limited public resources in other nations, especially less-developed nations;

 extensive public requirements for competitive bidding procedures and contractual arrangements in the U.S.;

 wariness of U.S. lending institutions toward supporting private infrastructure initiatives;

participating by international banking institutions such as the World Bank and the IFC in supporting infrastructure projects in less-developed countries.

To facilitate the development of more turnkey projects, project sponsors must develop more opportunities for generating revenue for transit projects through innovative public-private partnerships and/or non-operating revenue.



FIGURE 1 Conventional procurement.

Source: Figura, Roger, "Turnkey Financing for Public Transportation Projects," <u>Lessons Learned—Turnkey</u> <u>Applications in the Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. I-10





Source: Figura, Roger, "Turnkey Financing for Public Transportation Projects," <u>Lessons Learned—Turnkey</u> <u>Applications in the Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. I-10 José Barbero Metrovias, S.A. Buenos Aires, Argentina

Mr. Barbero discussed concession arrangements in place to manage the operation of individual lines of the Buenos Aires Transit System and, the use of concession agreements to apply turnkey to older, more mature rail systems. In Buenos Aires, the concessionaire is responsible for running the system and managing a capital program. The concession contract allows the concessionaire to make risk investments deemed appropriate. Mr. Barbero noted the 20 year length of the concession contract and the need to amortize costs associated with any risk investments over this time period. This lead to an investment emphasis on station advertising and retail activities.

At the onset, it is important to conduct market studies to understand rider demographics, spending patterns and the demand for products and services within stations. He observed that the value of these investments increased over time as the system improves and ridership increases. But there are challenges posed by such programs as the concessionaire must understand its mix of station uses, integrating pedestrian flow and system technical needs with the public and concessionaire's desire for commercial space and services.

Daniel Farray Departement des Infrastructures Ingeniere des Infrastructures Paris, France

Mr. Farray profiled Paris' early efforts to integrate transit community redevelopment with and innovative public/private cooperative (joint) ventures. The project involved the redevelopment of a large urban tract in the center of Paris ("Chatelet-Les Halles" and its commercial Forum) pursuant to the 1960's relocation of the Halles de Paris wholesale food markets outside of Paris' downtown to the near southern suburbs. The market relocation vacated 5,000 square meters of land in the historic center. In 1963 a civil company was established for the Halles development design, the S.E.A.H. (Societe civile s'Etudes pour l'Amenagement des Halles). Initial redevelopment plans (1966) included a much larger 35,000 square meter area which was reduced to 15,000 square meters by 1971. This followed from the decision in the late sixties to have the Express Regional Metro (R.E.R.) align across the Halles district with the resulting redevelopment relocated underground. The project took on the character of a major town planning project.

The Paris City Council signed a concession agreement with the SEMAH, a financial company, for the development and renovation of the Halles district. The project called for two zones of integrated development with SEMAH authorized capital of 1,000,000 FRF (approximately \$ 200,000 U.S. at current exchange rates). The SEMAH shareholders were 76 percent public (51 percent the Paris City Council and 25 percent the State), with the remaining 21 percent coming from the private financial consortium. At the completion of the works and the marketing of the commercial spaces the SEMAH would go out of existence.

Based on a general program, SEMAH is appointed by the Paris City Council in a concession agreement. Other project owners share the Halles urban space, mainly the authority over Paris mass transportation systems (Syndicat des transports Parisiens), for the mass transit system operating company (Regie Autonome des Transports Parisiens) and the nation telecommunication company (France Telecom). The project involves 170,000 square meters of mostly underground commercial development in the Forum zone and multi-use residential, educational, recreational and municipal components. The transportation components include seven Paris metro lines, the Meteor line and a planned automated metro line scheduled for opening in 1997. The metro facilities reach a maximum depth of 22.50 meters with station platforms varying from 225 to 315 meters. The complex has five underground levels.

Development of the project was phased between 1971 and 1986. The total cost of all structures can be estimated at 8 billion FRF (\$1.6 billion, US). This amount includes the RER station, the public improvements and facilities, and the residential and commercial elements. The Paris City Council investment amounts to 1.5 billion FRF (\$300 million, U.S.). This total includes the grant to the project, the cost of public right-of-way, and the execution of the different programs (ways and accesses, gardens, cultural complexes, sports complexes, schools and other infrastructures).

The Chatelet-Les Halles district and its commercial Forum are a world scale example of urban underground development. The project is notable for it size and its penetration underground.

Mr. Farray observed that although financing sources and project owners are numerous, the project was successfully completed on time and within budget. In consideration of the financial and technical interfaces, construction within the schedules and costs imposed by the public authorities, the project is a notable example of joint public-private, commercial, urban and transit development.

Recognizing the many starts and stops that can face large scale transit and redevelopment efforts, Mr. Farray observed that France has a 20-year record of success implementing many of the programs and concepts being explored at this workshop. Jeff Carey Merrill Lynch New York, New York

Mr. Carey addressed the limited spectrum of ownership options available to U.S. transit systems and the fact that the limits on these options are now being tested.

Two important restrictions on the capacity of transit to leverage significant vendor financing should be examined. The first pertains to federal rules governing the issuance and availability of tax exempt financing. The financial benefits of this financing make it difficult for the private sector to structure arrangements less expensive to government than traditional means of government issued debt. The second pertains to the IRS definition on public and private activity which further limits the integration of private investment and tax exempt financing.

The speaker discussed new initiatives relative to the creation of State transportation infrastructure banks and their capacity to make loans to public and private system operators. He briefly considered initiatives in Washington, D.C. associated with making available unobligated funds from the Highway trust fund, and credit enhancement vehicles to expand flexibility.

Jack Sconzo Merrill Lynch New York, New York

Mr. Sconzo complemented Mr. Carey's presentation by profiling an off balance sheet financing by Metropolitano de Lisboa, E.P. (M.L.E.P.). The financing was for a major (\$2.0 billion) expansion of the rail net of the state owned and operated transit system. As described by Mr. Sconzo, the resulting finance placement was international, private and long term (15 years). The financing diversified the system's funding, provided for protection from foreign exchange rates and increased the owners market profile (liquidity, capacity, buyer base).

Mary Collins Partner and Attorney Orrick, Herrington & Sutcliffe San Francisco, California

Attorney Collins profiled the experience of the Santa Clara County Transportation Authority in the joint development of a promising Park-And-Ride site. The site is one of eleven park and ride lots serving a 21 mile, 33 station light rail line with a 13-15 percent fare box ratio. The goal of the SCCTA joint development effort is to increase development density with benefits in increased ridership and fare box recovery. The Authority evaluated the park-and-ride lots for their joint development potential. The Authority sought a ground lease with the developer building and financing the development. As a risk adverse agency, the agency issued an RFP for developer proposals to develop a highly ranked seven acre site where only 1.7 acres were required for transit dedicated purposes. It was important to integrate the proposed residential development into the community and to overcome the perception of the park and ride lots as unsecure, unsafe and unattractive.

A developer was selected following a careful selection process. The proposal called for 250 residential units, at 47.2 units to the acre in two and three story residential units constructed over subsurface garages. The development includes recreational and community spaces integrated into the development. The proposed development is complementary with popular development trends in the San José area.

The selected developer was challenged to arrange the necessary project financing. Ms. Collins noted that SCCTA, as other agencies should consider, assisted the developer in financing the project through the issuance of tax exempt bonds. In this instance, a multi-family bond issue was selected with favorable terms resulting of setting aside twenty percent of the units for moderate income residents. This was viable in the affluent community because of the existing 99 percent occupancy rates and the scarcity of affordable housing for moderate income persons. The project was made more attractive and financially viable as it qualified for FANNIE MAE mortgage guarantees. At the time of Ms. Collins presentation the project was pending further state finance authorizations.

The success of this joint development has encouraged SCCTA to consider the joint development of more of its park-and-ride sites. The most favorable joint development site was not previously selected because it was subject to the FTA Land Disposition Rule. Attorney Collins noted that FTA's announcement at the Tren Urbano workshop that the Land Disposition Rule was under reconsideration was encouraging news. It might facilitate the joint development of more promising sites.

Discussion

The question that garnered the most discussion pertained to the use of an outside development team to structure and implement transit agency joint development programs. The pros and cons of applying this management model were discussed in depth, with proponents noting the advantages of applying private sector expertise and others noting that developers want to develop and not represent the agency in managing the process. In addition, significant time was spent on the relative financial import of joint development projects. While speakers noted that revenue from projects can account for 5-6 % of system operating costs in the U.S., it was noted by Mr. Barbero that in a private concession situation, this 5-6% is a highly profitable component of the teams efforts. It was also noted that in Asia, sale of air rights can account for 15-25% of capital costs, and land lease arrangements can generate up to 50% of operating costs.

In wrapping up the afternoon's activities, Carlos Colon asked whether subsidizing transit has become a self-fulfilling prophesy, and wondered whether the rules preventing transit agencies from doing wrong also inadvertently prevent them from making correct, rational decisions

An International Perspectives-Hong Kong

Charles Nicholas Brooke Senior Partner Brooke Hiller Parker Hong Kong

In his paper, Large Scale Real Estate Development and Marketing Strategy: Hong Kong Development— Railway Station Development, Mr. Brooke discussed the joint development activities of the Hong Kong Mass Transit Railroad (METRO) emphasizing large scale real estate development and the related marketing strategy. Metro is government owned, receives no subsidy and operates an 85 kilometer, full metro system consisting of three lines. The system has been in service since 1979, serves seven million Hong Kong residents and averages 2.5 million passengers daily. Its joint development activities have yielded eighteen developments, including 31,000 apartment housing units and 440,000 sq. meters of commercial development.

Hong Kong is a large, dynamic, fast growing commercial city and region contiguous to the New Territories and Kowloon sections of the south China coastal mainland and the islands of Hong Kong and Lantau Island. The land areas are largely, difficult mountainous terrain interspersed with foot hills and valleys which are developed. Population densities are very high and available developable land is intensely utilized especially on the island city of Hong Kong. Major sea port and airport developments are underway utilizing man-made island structures in lieu of available land. Metro serves, or is being extended to, each of these areas.

Real property development plays several roles in the funding and the success of METRO:

 utilizes potentially redundant air space and development rights

- generates passengers and operating income
- enables strategic planning (office decentralization

and new towns) and, produces profits and income for METRO.

Mr. Brooke discussed the joint development process as practiced by METRO.

(A) Conceptual Phase—Establish a market driven development mix. The selected developments have five to six year lead times, are subjected to feasibility analyses and must blend rather than compete with other METRO properties.

(B) Packaging by METRO—Inviting interested architect/engineers to develop the conceptual proposals into architectural designs. During this phase there is close interaction between the design consultants and the railway designers and engineers.

The METRO and the design consultants secure the appropriate planning and environmental approvals. METRO's professional team develops the tender/bid packages.

(C) The Mechanics of Bidding—The size and scale of the resulting projects tends to be enormous, necessitating a structured bidding approach. In the structured bidding, METRO issues an expression of interest solicitation to prequalify bidders relative to financial and technical capabilities. Following the review of the technical and financial capabilities, firms are shortlisted and an invitation to bid (tender) for development is issued to the short listed firms. The short list usually is five or six firms for commercial projects. The short list may be longer for residential projects which are very profitable for the developer.

The design specifications and documentation are detailed with little scope for revisions. There are many technical and design manuals. The purpose here is to control the development and ensure accountability.

(D) Requirements of the Developer -There are certain requirements placed on the developer which include:

- Payment of air rights by way of lump-sum, upfront premium payment.
- (2) Accept all financial and development risk and frequently, by way of a down-payment, to fund certain rail related improvements.
- (3) Provide guarantees in regard to the financial and technical performance,
- (4) Produce cost estimates and building specification to indicate quality of the development.
- (5) Provide a detailed program.
- (6) Provide information on the technical team inhouse capabilities and generally to demonstrate the ability to deliver.
- (7) Provide a detailed financial proposal showing revenues, costs, profits, etc., and to indicate what

part of the profit the developer will share with the METRO by way of advance payments, guaranteed shares and amounts, and balance at risk

In the case of retail accommodations, the developer is not allowed to resell but must rent and offer METRO a share of the rental income for the duration of the leasehold.

E. The Bidding Process—Developer bids are evaluated and scored on technical and financial merits by separate panels. The technical and financial panels are expert groups and frequently international in makeup. The scoring results are merged and the bidder with the highest total score is awarded the contract.

F. Experience and Lessons Learned—There have been many lessons learned to date. Clearly, there is a need to proceed in a planned and targeted manner, and the transit elements and services must be available as promised. Since the developer bids not knowing the land costs, bids are frequently based on a range of land costs (high and low) with subsequent negotiation.

Mr. Brooke discussed the lessons learned from the perspective of the owner (METRO) and the developer. From the owner's perspective the lessons include:

The inflexibility of the METRO approach, its unwillingness to consider design changes, development alternatives and profit sharing, discourages some developers. The process of dealing with a quasi-governmental body can be frustrating. The size of the bid packages is daunting with the minimum package equivalent to United States \$500 million. METRO can be a difficult client as the metro operation takes precedence. Interfacing of the METRO with the developer and between developers working on different phases is a problem.

• The large investment amounts and a lack of local know how makes it difficult for foreign investors and developers to compete, even if they have an interest. Only Singaporean consortia have been successful to date, but the latest series of bids include Malaysian and Indonesian interests.

• Some developers are reluctant to share profits and prefer to focus on schemes where they can enjoy the full profit and not share.

The duration of the developments spans periods of eight to twelve years. Developers are exposed to fluctuations in the property cycle and it is difficult to anticipate what will be the situation that far ahead. For this reason, longer term potential profits are discounted heavily.

From the developer's perspective there is strong interest and competition. This is due to:

The accessibility provided by the transit system to the entire urban region.

Location. Location. Location.

The station sites are attractive for the development of large flagship statements. The locations are likely to hold their value better even in the event of a downturn. The ready access of the transit system makes it possible to decentralize office locations to various transit station locations. The sites are especially attractive for regional shopping centers, new residential communities (New Town sites) and tourist and leisure attractions.

Federal Perspective

Edward L. Thomas Director, Office of Planning Innovation and Analysis Federal Transit Administration U.S. Department of Transportation Washington, D.C.

Mr. Thomas discussed the Federal Transit Administration's Turnkey Demonstration Program. The program started in 1992 and to date has committed \$3.9 billion to five turnkey demonstration projects. The projects in the demonstration program are the Baltimore Light Rail Extensions (\$106 million), the Los Angeles Union Station Gateway (\$150 million), New Jersey Hudson-Bergen LRT Line (\$350 million), San Juan Tren Urbano (\$1.25 billion), and the Bay Arca Rapid Transit (BART) San Francisco Airport Extension (\$1.17 billion). Mr. Thomas noted these projects range in their type and in their requirements and provide a base of experience for understanding the turnkey process.

The five FTA demonstration projects vary relative to their turnkey provisions. Baltimore and San Francisco are limited civil and systems design build contacts, San Juan and Los Angeles are modified turnkeys with systems operations and maintenance incorporated in the projects. New Jersey represents a full turnkey with the contacting consortium including important project finance provisions.

Mr. Thomas reviewed the outreach and assistance FTA has provided to the transit project sponsors and contractors in initiating turnkey projects. The major aspects of the technical assistance includes industry seminars and workshops; project sponsoring agency workshops; expert technical assistance, and project evaluations which are being conducted by independent contractors.

Between 1987 and 1992 there was a 300 percent increase in design-build projects, indicative of the growing importance of turnkey projects in the construction industry. By 1995, 30 percent of all non-residential construction was using the turnkey method according the statistics provided by the *Engineering News Record*. The growing importance of turnkey approaches was credited to its benefits in saving time and costs with no reduction of quality relative to conventional project approaches. The example of the Taipei Rapid Transit was cited as demonstrating the problems inherent in conventional transit construction projects, with 90 percent cost overruns and years behind schedule in completion. The problems in Taipei included:

inadequate organizational support

contracting difficulties resulting in disputes, claims and legal actions

poor communications between the general engineering consultant, the owner, and contractors

- ineffective systems integration
- inadequate media and public relations
- inadequate documentation for operations.

Mr. Thomas observed that many U.S. projects experience problems similar to Taipei. Among the advantages of turnkey approaches are the systems view and partnerships they encourage involving project development, finance, cash flow and work flow. There have been a number of lessons learned in the five FTA turnkey demonstrations and these include:

New Start Planning and Project Development

 Incorporating analyses of implementation options during major investment studies

 During preliminary engineering for turnkey projects as much as 60 percent of the final design for civil elements is completed as contrasted to only 30 percent for conventional projects

Final design and construction for conventional projects are separate phases as compared to one implementation phase for turnkey projects.

Turnkey Design/Build Procurement Process

 Acquisition planning, research and strategic assessment preliminary to the turnkey project decision

• Industry review of draft solicitation documents can help the public agencies allocate risks and decide whether changes in traditional procedures are warranted. All interested firms should be invited to industry outreach events.

Early Project Development

 Complete preliminary engineering and environmental assessments before initiating a turnkey procurement

- Assess project costs, schedule and financial risks
- Tailor turnkey approach to local situation

• Agency roles include rights-of-way acquisition, utility relocation, environmental mitigation, public participation and geotechnical surveys.

Procurement

Emphasize extensive project definition

Consider changing Federal/State prequalification policies

Avoid overly restrictive clauses and risk assessment

Provide clear responsibility to control integration issues

Ensure full and open competition through small and minority business participation

Establish effective cost, schedule and quality control.

Project Financing

 Consider innovative financing alternatives including contractor assisted financing, joint development of station areas, construction financing and profit deferrals

Avail all contractors of financing alternatives

 Because of the time and cost sensitivity of turnkey projects, documentation of payment procedures and processing of payment requests are extremely important.

Risk Management

- Define and clearly allocate identifiable risks
- Develop risk management approach.

Project Management

Increased need for project management control systems

Session 2: Procurement and Subcontracting

Session Chair: Subhash R. Mundle President Mundle & Associates Philadelphia, Pennsylvania

Session Highlights:

A negotiated procurement or a two-step procurement is recommended for design-build/turnkey contracts. Discussions between the owner and proposers facilitates a true "meeting of the minds"; allows crafting of tailored solutions for contractor concerns; and achieves the optimum balance of risk and price.

Federal, state and local procurement regulations

offer varying degrees of flexibility for the procurement process necessary for design-build. The federal government and most states allow turnkey for some agencies and/or projects. Some states have recently expanded regulations to permit design-build contracts. This trend is likely to continue and could be facilitated by federal incentive.

Turnkey requires a well-conceived, complex contract. Using conventional contract documents (terms and conditions) does not effectively address the melding of the design, construction, and operations elements of the turnkey contract. Some clauses that warrant special analysis and consideration include: change order, contractor job cost system requirements, audit, performance bonds and warranties.

The turnkey approach has the potential to reduce the opportunity for DBE, small and mid-sized firms. Because the number of prime contracts is reduced and "mega-teams" will be required to respond to turnkey scope, these small and mid-sized firms will likely be relegated to less visible roles, without direct client interaction. The main concern is that these firms will fail to develop the experience needed to grow and contribute meaningfully to the next project and will instead become merely "body shops."

If turnkey does not result in project completion on time within budget, it is no better than the conventional design and construction approach. Turnkey procurement was conceived to achieve project implementation with a possible savings of time and greater certainty of budget. Like all approaches, the turnkey procurement strategy must be evaluated and measured with respect to the project implementation objectives. Effective techniques implemented by some turnkey projects include: requesting industry comments on documents prior to solicitation, following a detailed and fair selection process, selecting one prime contractor for a single-point of responsibility, and establishing detailed cost elements for the fixed price to facilitate change order negotiations.

Bedros Enfiedjian, Gardner Consulting Planners Carson, California

An overview of the resource paper "Transit Turnkey Procurement: Lessons Learned" was presented by the author. In summary:

Turnkey is viable strategy for undertaking the design, construction, operations, maintenance and finance of transit investments. Turnkey is inherently different than the conventional design, bid, build model. The five Federal Transit Administration Turnkey Demonstration projects indicate that turnkey provides for reasonable allocation of risks between the project participants; shortened project design and construction schedules; reduced owner/contractor and contractor/contractor disputes and claims, greater cost certainty; reduced owner project staff needs and; more direct and less diffused project responsibility.

Legislation

Federal legislation allowing the design/build or turnkey procurement method includes the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991, the Federal Acquisition Reform Act (FARA) of 1996, Senate Bill 1124 of 1996 and FTA Circular 4220.1 D. However, several of these recent federal regulations apply only to federal government agencies such as the Army Corps of Engineers and the General Services Administration, and not to grantees. A recent 50 State Survey of Public Agency Design-build Authority indicates that, in the last five years, many states have updated their procurement legislation to permit turnkey procurement. Twenty-one states now permit design build for some agencies and/or projects, while only ten states fully permit design/build procurements. Twenty-nine states have unclear legislation or have no position. Many of the current transit turnkey projects had to enact legislation or receive waivers to permit various elements of the design/build process, as well as allow the pre-qualification of bidders.

Turnkey Strategies and Issues

Under a typical turnkey procurement, a transit agency contracts with a single private entity, the turnkey contractor, for the design, construction and delivery of a complete and operational project. In some instances, the private contracting authority is required to operate and maintain the system for a defined period of time. The private contractor is typically a consortium of private companies offering engineering and design, construction, manufacture of vehicles, finance and related support services. Some or all of the aforementioned capabilities may be included in the private consortium depending on the project particulars.

Various approaches to turnkey exist (see FIGURE 3): build-operate-transfer (BOT); build-transfer-operate (BTO); modified turnkey; separate or combined civil/systems turnkey; and super turnkey. Selection of an appropriate approach depends primarily on state and local legal requirements, local implementation objectives, available finance resources and expertise of the owner staff. Negotiation or a two-step procurement process is strongly recommended for selection of a turnkey contractor. In addition, soliciting comments from the industry on the proposed procurement documents has been quite successful and is highly recommended .

With the wide range of project development approaches offered by turnkey, acquisition planning, including whether to proceed with a turnkey implementation and, if so specifically what type of turnkey strategy, is very important. With turnkey projects more effort appears to be required in concentrated project planning and preliminary engineering with less preliminary phasing of the design, construction and contracting requirements on the part of the public sponsor.

Turnkey requires different management and professional capabilities on the part of the sponsor as contrasted to conventional procurements.

	Alternatives Analysis	Preliminary Engineering	Final Design	ROW/ Utilities	Const. Guideway	Const. Fixed Facil.	Systems	Start-up & Testing	Operations & Maint.	Funding/ Financing
Traditional Method										
Agency		Θ	•	•	0	0	0			
Design Consultant				0	0	0	0	0		
Systems Consultant			•	0	0		0	0		
Systems Supplier					0		•	0		
Civil Contractor(s)				L						
Full Turnkey (BTO)										
Agency			0		G	G	0	G		
Gen. Design Cons.		0	0	0	0	0	0	0		
Turnkey Contractor		0	•		•		•			
Full Turnkey (BOT)										
Agency			0		0	0	0	0	G	•
Gen. Design Cons.		0	0	0	0	0	0	0	0	
Turnkey Contractor		0	•							
Modified Turnkey										
Agency		•	0		G	0	0	G	0	
Gen. Design Cons.		0	0	0	0	0	0	0	0	
Turnkey Contractor		0	•			0				
Civil Contractor		ing and the second second								
Superturnkey										
Agency	0	•	0		•	G	G	G	0	
Gen. Design Cons.		0	0	0	0	0	0	0	0	
Turnkey Contractor		0	•			G	•			0
Legend: Primary responsibility Secondary / management responsibility Supporting responsibility										

FIGURE 3 Public agency role in different types of turnkey contracts.

Source: Enfiedjian, Bedros, "Transit Turnkey Procurement Lessons Learned," <u>Lessons Learned—Turnkey Applications in</u> the <u>Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. V-16 Turnkey can benefit the sponsor with less technical and engineering resources and experience. Turnkey can also benefit the sponsor with financial and schedule constraints. The timely execution of the project through turnkey design and construction can result in cost savings due to shorter inflation periods. Recent turnkey procurements have required the private consortium to participate in the finance of the projects.

To date, the turnkey demonstration programs have exceeded DBE participation goals.

W.H. (Ray) Lytle, Jr. President RL Associates, Inc. McLean, Virginia

Turnkey is not a new procurement approach and has been used extensively in the military to achieve improved contract performance and efficiency on complex projects. Relative to conventional procurements, the magnitude and complexity of the procurement increases with turnkey. This has to do with the increased number and range of elements included in a turnkey contract relative to conventional multiple contracts.

Where possible, it is advisable to undertake a negotiated procurement. The objective is to find out as much about the contractor as possible prior to entering the procurement phases. If a negotiated procurement is not possible a two phase procurement with negotiation with the best qualified proposer is acceptable.

Pre-acquisition planning is very important in nonconventional procurements. Most important is knowing what are the objectives of the implementation and, what is legal in the state of the undertaking. Most of the changes in procurement requirements to date have not benefited turnkey contracting at other than the Federal level.

Turnkey need not preclude the involvement of small and disadvantaged businesses.

Dr. Delon Hampton Principal Delon Hampton & Associates Washington, D.C.

The turnkey approach *may* result in a shorter schedule and lower project cost, provided that the owner has:

 Staff who are knowledgeable in turnkey and wise enough to let the contractor perform without undue interference;

- A capable turnkey contractor and;
- A decision-making process in place that will provide

timely responses to the contractor during project execution.

Without these items, any expected cost savings can easily be eliminated.

The turnkey process will have an adverse impact on small and medium-sized firms (including DBE firms) for the following reasons:

Reduced number of prime contracts, and therefore a limited number of contracting opportunities.

 Higher proposal costs due to the more extensive proposals required for turnkey projects, reducing the ability for smaller firms to sustain the required investment.

 Reduced quality of participation for small and mid-sized firms who will probably not have a leadership role in proposal preparation or project execution.

Minimal incentive for prime firms to include small and mid-sized firms on the team and/or in meaningful roles, reducing their ability to grow and develop expertise for the next project.

The overall participation of DBE firms will likely decrease as a result; turnkey procurement may lead to the demise of many DBE firms. Turnkey procurement offers the *possibility* of reduced cost if properly managed, but it is likely at the expense of employment and business opportunity for small and medium businesses.

Karen Hedlund Partner Nossmann, Guthner, Knox & Elliott Los Angeles, California

Although at present very few states allow it, a negotiated procurement method is strongly recommended for turnkey. A two-step bid process is an improvement over a selection based on low bid without pre-qualification, and both offer the benefit of an "apples to apples" comparison. However, both bid processes have shortcomings: bidder comments are frequently unclear; bidder "wishes" vs. cost-drivers or deal-breakers are not always discernible; and contract changes are offered to all bidders, perhaps offering unnecessary concessions of little importance to the successful bidder.

The absence of negotiation leads to decision making without communication. Negotiation allows the owner to understand and explore the real basis for concerns of the proposer. Tailored solutions can be crafted to achieve the optimum balance between risk and price. And, the contractor develops a better understanding of owner expectations. Negotiation results in "the best deal for the best price" and is more likely than a bid process to achieve a true "meeting of the minds." Negotiation can lead to optimum decisions.

Michael B. O'Connor Procurement Manager Bay Area Rapid Transit District (BART) Oakland, California

Design-build has been used in the power and petrochemical industries for many years; these industries have already achieved some "lessons learned" that we can apply to transit. Most significantly, these industries have developed a sense of when not to use the turnkey approach, as for example, on projects with high contractor risk because the proposed prices are too high.

Design-build requires a new generation of contract documents that incorporate the needs of three distinct elements: design, construction and operation. Melding the required pricing and procedures into one contract is a complex and challenging endeavor.

Typical post-award concerns with design-build contracts appear in the areas of managing and pricing changes, interpretation of commercial terms, and obtaining adequate cost data to support change orders. Specific recommendations for turnkey contract clauses include:

requirements for contractor job-cost systems;

pricing change orders based on the job-cost system; and

detailed audit provisions.

Amar Sapal, PE Chairman—Honolulu Public Transit Authority Senior Project Manager O'Brien-Kreitzberg, Inc. Honolulu, Hawaii

Honolulu decided to go turnkey for its transit system in an effort to achieve greater cost predictability. At the time this project was conceived, the national trend was for projects to be completed over budget, and the political climate demanded greater certainty about the real, final project cost. In addition, an FTA funding limit established that any cost increases would be paid out of local funds.

Honolulu worked through several legislative, regulatory and process restrictions to award the turnkey contract. The FTA helped to identify the real concerns and develop workable solutions for federal procurement constraints, such as accepting a \$250 million performance bond instead of the 100% bond typically required.

Suggestions for greatest effectiveness of a turnkey contract:

seek industry input on documents prior to solicitation;

 develop and follow a detailed selection procedure that includes a multi-disciplined and knowledgeable evaluation committee; and

keep the implementation objective in mind.

In addition, to keep the project cost contained:

 select one prime consultant, establishing a single point of responsibility; and

establish a fixed price with a detailed schedule of costs.

The turnkey approach is only better than conventional contracting if it actually results in a project that is within budget and on time.

Discussion

QUESTION: Would you comment on the use of design-build-operate/maintain?

ANSWER: Honolulu included five years of operations and maintenance in the turnkey contract so that the contractor would construct and de-bug the system before the agency assumed ownership. The Hudson-Bergen Light Rail Line has a fifteen year maintenance period. Benefits of this strategy include: built-in contractor warranty period; and incentive for contractor consideration of life cycle costs. Challenges include: financing, performance bond requirements; pricing contingencies; and determining the appropriate length of the operations/maintenance period.

QUESTION: What strategies help to achieve adequate DBE participation in turnkey contracts?

ANSWER: To minimize the opportunity for "bid shopping" of DBE firms, FTA policy requires that all DBE firms be identified at the time of proposal, and that no substitutions are allowed without prior approval. An incentive/disincentive clause tied to meeting DBE participation goals is also an option. (Liquidated damages may be perceived as a penalty and not enforceable in this instance; an incentive/disincentive clause will avoid this problem.)

QUESTION: How can consultants adapt to the changing environment of turnkey? What strategies would you suggest?

ANSWER: Design-build has changed the business environment for design professionals. The owner is not necessarily their client. The cost of getting new work is greater and requires more "sweat-equity" due to the increased requirements of a turnkey proposal. Study consultants who have effectively managed the transition in the power and petrochemical industries. Design-build contractors have corresponding concerns because they must learn to select and manage consultants. With time and experience, they will become more adept. The design-build process admittedly removes some of the comfort and guarantees that the professional community is used to experiencing while doing business with agencies. However, the "up side" cap is also gone; with greater risk, the profit potential is likely more significant.

QUESTION: Is a federal law feasible to permit design-build for all federally funded projects?

ANSWER: Federal laws in the area of procurement are typically permissive, not prescriptive. A prescriptive law is unlikely because the federal government is unlikely to pre-empt the states' ability to set procurement regulations. An incentive, such as was implemented with the Brooks Act, which requires the availability of design-build as an option in order to receive federal funding, may be appropriate though.

QUESTION: Is it easier for state agencies to do design-build than for non-state grantees?

ANSWER: Only three of the approximately 1400 grantees in FTA programs are considered state agencies and therefore exempt from some of the requirements of 4220; most of the FTA grantees have the same restrictions. Typically, rules governing grantees lag those that apply to government agencies. It is probable that the permissive design/build elements now available to the government agencies will be incorporated in the future .

Session 3-International Turnkey Experiences and Development: Lessons Learned

Session Chair:

Dr. A.M. (Tony) Yen Deputy Associate Administrator for Research, Demonstration and Innovation Federal Transit Administration Washington, D.C.

Session Highlights

 Turnkey participants have different interests and motivations. Successful projects require communication, understanding and a willingness to work together.

 Forming partners and teams for turnkey projects are important decisions. There must be trust, competence, a willingness to take chances and a commitment to succeed.

Complex projects with involved and detailed requirements take longer to complete and have higher risk. Environmental approvals, intergovernmental coordination, and finance should be in place prior to the turnkey procurement.

 Turnkey projects require innovative approaches that balance the interests and risks of the participants. Considerable time and cost savings are realizable.

Anthony Daniel Chairman PB Transit and Rail Systems, Inc. San Francisco, California

The turnkey experience can be good or bad, it depends on how it is undertaken. Typically the client wants the contractor to undertake most of the risk, while the contractor wishes the risks to be shared. The client is motivated by the having the project done well for the public and tends towards the conservative. The contractor is driven by profit. There must be an understanding and a willingness to work together.

The successful project requires that the responsibilities of the parties be clearly defined. The procurement documents need to be clear and equitable. In particular the project must have a champion, someone committed to the project's success. The financial considerations must be adequate, contractors will not undertake projects that are inadequately financed. There must be a well defined base plan. There must be good organization including the client team and the contract team.

Mr. Daniel cautioned relative to defining the length of the operating period required of the contractor. Long operating periods, e.g., over fifteen years, include the period when equipment becomes less reliable. The contractor will compensate for this added risk by including a significant cost in the operating agreement. As a consequence the cost of the project for the client will be somewhat more than would be the case with a shorter operating period.

In summary the following must be present:

- understanding on both sides
- the right partners
- the willingness to take chances
- the parties must listen to each other
- an understanding that this is not business as usual
- commitment to succeed

John Smith

Executive Director, Transport Planning New South Wales Department of Transportation Sydney, Australia

Sydney is a region of 2.4 million people with expected growth of one million by the year 2021. Currently, there is a seventy-five percent modal split for transit for travel to central Sydney. Continuing investments in transit systems including existing rail system upgrades, new bus fleet and interchange, and terminal facilities.

The city has both the European urban development of higher desensitizes and transit focused, and the American suburban, low density development recently. Air quality as an important issue in transport policy.

Sydney has adopted key directions for future growth: more compact city, better environment, more equitable and efficient city, effective implementation strategy. Integration of transportation and land use, e.g. similarities to Portland, Oregon, with emphasis on implementation of plans. Based on those key directions, transportation policy shifted to accessibility rather than mobility. Recognition of the importance of the private sector in shaping the city through urban renewal, road and transport projects.

Two turnkey transit projects are under development:

(1) New Southern Railway—10 kilometers of underground heavy rail, connecting the domestic and international airports. Estimated daily ridership is 46,000 passengers. The project under construction with a scheduled year 2000 completion. The total project cost is \$700 million, including private sector investment in ownership of four stations. Complex joint public/private agreements for design and construction, operations and maintenance, and consortium station access and train service fees.

(2) Light-rail project (Ultimo Pyrmont) connecting central Sydney with urban renewal area which includes casino, residential and commercial developments. One project consisting of ten stations spread over 3.7 kilometers including on-street and dedicated rail right-ofway. Project cost ninety million dollars including government grant of twenty-five million dollars. A series of agreements including a project deed, a design and construct agreement and, a land agreement. Fares will be set by the consortium with performance standards defined in deed.

Mr. Smith acknowledged the following lessons learned:

turnkey projects take a long time (five years in development)

contracts are complex and intertwining

need to understand the relationship between transport and land use

keep organization "lean and mean"

need capable professionals when they are required

 all parties, including politicians, need to understand risk and its apportionment

there must be trust among the participants

 assign responsibility commensurate with capability and maintain accountability for design and construction

keep the focus on outcomes

engineering and project financial resources must be consistent.

Robert Weber Director of Systems Integration Siemens AG Transportation System Group Erlangen, Germany

Mr. Weber observed that turnkey projects are always large and high profile in nature. The project's size, he noted, limits the potential numbers of turnkey contractors. Among the challenges of such large scale projects is the client inexperience and the need to develop a strong clientconsultant relationship. Other important factors are the correct systems definition, the engineering interface and the project finances.

The following recommendations were presented:

 as systems integration is very important, a single contractor and a one-hundred percent turnkey undertaking is preferred.

important decisions should be demand led and not systems led.

intergovernmental coordination and finance should be in place prior to the turnkey procurement

select a competent contractor

industry is willing to participate in finance, ownership and risk but the solutions must be realistic In conclusion, it was observed that turnkey projects require new approaches and that thirty percent cost savings and two year time savings are realizable.

José Barbero Metrovias, S.A. Buenos Aires, Argentina

Following an extended period of severe deterioration and heavy subsidization under public ownership and operations, beginning in 1992 the government advertised concessions for individual transit lines and the Metro. Under the concession agreements, private concerns would operate, maintain and rehabilitate the individual components of the system while the government would continue as the owner of the system. Two bids were solicited, one for operations and a separate bid for capital improvements. For operations concessionaires had to establish how much subsidy would be required to maintain fare levels. Capital improvements emphasized replacing obsolescent and deteriorated system elements.

Concessions were awarded in 1993, with private operations initiated between 1994 and 1995 for individual services. Since 1994, significant improvements have been observed in service quality and ridership. On the Metro with a base of approximately one million daily riders, a fourteen percent increase in ridership has been experienced since 1994. On some segments of the transit system with a smaller base ridership the percentage improvements have been much higher than on the Metro. Surveys of riders have indicated that passenger satisfaction has improved to eighty-five percent from less than fifty percent in 1994. The subsidy required for the Metro has decreased by two-thirds since 1994 and is projected to decrease by a further fifty percent by the year 2000.

Mr. Barbero observed the following lessons learned:

• Government must be reliable and timely in meeting its obligations with the concessionaires. The initial hesitancy of private companies to be concessionaire has decreased as the timelines and reliability of the government has been demonstrated.

• A number of companies with limited or no transit experience have participated as concessionaires. New technical and managerial experience has resulted.

Concessionaires are paying taxes and otherwise contributing to the local economy.

 Ridership increases resulting from service improvements may render the existing capital program inadequate. Session 4: Value Engineering, Design and Construction Session Chair:

Nuria I. Fernandez

Assistant General Manager for Design and Construction Washington Area Metropolitan Transit Authority Washington, D.C.

Session Highlights

Value engineering (VE), quality control and quality assurance are close cousins. VE can result in considerable cost savings with no loss in QC/QA.

Value engineering is comprehensive and includes the design, construction and procurement of major transit investments. The savings resultant from value engineering are frequently many times the costs of the value engineering studies.

Turnkey contracting can be a form of value engineering. Requirements for value engineering studies in transit turnkey projects are subject questions concerning the necessity in the context of the prevailing incentives.

• The considerable cost savings generated by value engineering is typically shared between the owner and the contractors. Contractors are generally not rewarded for value engineering savings they identify in their work.

 The incentive for value engineering in the design phase of conventional and turnkey projects are not certain. There must be incentives for the designer to engage in value engineering.

Value engineering in the context of turnkey is still evolving. Just as turnkey is many different approaches with no single established practice, value engineering will have to adjust to the requirements, opportunities, incentives and constraints resulting from turnkey approach and procurement.

Thomas J. Luglio, Jr. , P.E. EG&G Dynatrend, Inc. Bryn Mawr, Pennsylvania

Mr. Luglio reviewed his resource paper ("Value Engineering, Design and Construction") which addresses value engineering (VE) in both a project's design and construction phases; quality assurance (QA) and quality control (QC) as applicable to support design, construction, manufacturing, and testing functions; and the degree of contractor implementation freedom permitted. These are considered from the perspective of both conventional and variations of turnkey implementation approaches.

VE is a process of attempting to obtain the essential

function of an improvement at the lowest life cycle cost by refining its design and encouraging efficient construction. Given that the turnkey contractor is responsible for both design and construction, certain incentives will exist to achieve value engineering efficiencies, and the degree to which value engineering still has a role in these contracts is considered.

QA and QC are elements of a quality system which encompasses the organizational structure, responsibilities, procedures, processes, and resources for implementing quality management. Quality in a project management sense is on a footing with cost and schedule control.

There are two basic aspects of value engineering, related to design and construction, respectively. During the design stage an independent team specializing in value engineering is utilized to conduct a value engineering study. The construction value engineering includes phases for implementation, speculation, analysis, development and, presentation. During the construction stage, contractors can be permitted to offer value engineering change proposals (VECPs). If deemed worthwhile because of their cost savings, the value engineering change proposals can result in monetary benefits which are shared between the owner and the contractor.

The speaker reviewed the FTA requirements and guidance of value engineering and QA/QC. These are formulated for the conventional (design-bid-build) implementation approach. value engineering studies are generally conducted at or near the end of preliminary engineering (PE). For some large complex projects a second value engineering may be advantageous, with the second value engineering conducted at 60 to 75 percent completion. Other design refinement techniques (e.g., peer review; design reviews; agency/community outreach, industry reviews and pre-bid meetings) were considered. Mr. Luglio noted that as part of the Turnkey Demonstration Program, FTA made teams of experts familiar with turnkey projects and concepts available to grantees to review the grantee's approach and for the discussion of related issues.

The speaker observed that while it has become accepted practice for construction contractors to be responsible for QC functions, the owner maintains responsibility for QA functions, possibly supported by a construction management (CM) consultant. The owner should have a detailed QA/QC Plan to guide their QA activities and define contractor responsibilities. The FTA Turnkey Demonstration projects are consistent in assigning QA and QC responsibilities to the contractor, including the construction management function usually performed by the owner on conventional contracts. The contractor must prepare the Quality Program Plan for the owner's approval. The owner's role becomes one of quality oversight. Mr. Luglio closed with the following observations and recommendations:

■ Value engineering during the design stage has proven to be a valuable tool in identifying potential cost savings. The cost savings of the accepted proposals typically exceed greatly the cost of performing the value engineering study.

• Value engineering studies should be conducted towards the end of the preliminary engineering, with sufficient time to consider proposed changes and to incorporate them into the turnkey procurement package.

• A contractor has inherent incentives (and disincentives) based on the scope and extent of the turnkey contract and the nature of the pricing. The owner only benefits from the contractor's incentives to the degree the contractor's costs to the owner are reduced. It is imperative that a high degree of competition be achieved when procuring turnkey contracts, either through competitive negotiation (RFP and evaluation of proposals) or formally advertised (IFB and low bid award).

Turnkey contractors have greater opportunity for creativity when working on an entirely new transit system. For a new system the owner can provide more of a performance specification to which the contractor develops the detailed designs.

• For extensions to existing systems, the owner must constrain the turnkcy contractor by providing very detailed designs and specifications. This limits the contractor's ability to achieve cost savings through innovative designs.

• The turnkey contractor should not be rewarded for recommending a value engineering change proposal on its own design. Value engineering change proposals must be limited to proposals challenging the owner provided baseline designs, standards and specifications.

Grantees who permit value engineering change proposals provide rigid requirements for the submission of contractor proposals.

• Since the owner must continue to perform some construction management functions in support of verification activities, including construction progress and contractor payments, it is possible that the total cost of quality activities may not be reduced on turnkey contracts.

The public nature of transit projects limits turnkey transit projects in their freedom to independently advance implementation activities. Good planning on the owner's part should result in giving as much freedom as possible to contractors to achieve the owner's time, cost, and other project objectives motivated by profit.

Alex P. Goff Principal Engineer Value Engineering Manager for the Hudson-Bergen Project in

New Jersey Communications, Signals and Track, Raytheon Co. Newington, Connecticut

Mr. Goff noted that the terms and concepts of value engineering, value analysis and value management were interchangeable. They refer to the systematic process of adding value. The role of the Society of Value Engineering (SAVE) in recognizing Certified Value Engineering Specialist was considered as well as the history of the value engineering process. The role of federal agencies, including the FTA, in requiring value engineering for major investment projects was commented on.

The speaker emphasized that value engineering teams must be independent of the design team. Value engineering should take a fresh and unconstrained analysis of design requirements and solutions. In conventional projects, value engineering should be undertaken at the 30 percent design stage, while for design-build turnkey projects, value engineering should be undertaken as early as possible.

Several case studies were cited associated with the San Francisco Bay Area Rapid Transit (BART) system. In the first case study of a value engineering analysis of a ticket vending machine acquisition, the original vending machine specification was changed to utilize privately provided bank style ATM machines to dispense high value tickets. This resulted in a \$5 million cost savings and greatly improved customer service. In the second case study of a train control system for two new lines, the initial decision to specify the existing train control system was replaced with a performance based specification where one performance standard was compatibility with the existing train control system. Approximately \$2.5 million in cost savings resulted. Other benefits included increased safety and increased capacity due to decreased headway.

Several other BART case studies were referenced where for a total study cost of \$125,000 the owner experienced a total cost savings of \$17.5 million. Overall the savings to cost ratios on the cited projects ranged from 25-to-1 to 158-to-1.

Value engineering is most applicable to high cost, high technology type items and safety considerations. Operations, systems, communications, civil, structural, financing plan, maintenance and route alignment are among the other promising areas for the application of value engineering.

Frank Waesche III, P.E. Director, Office of Engineering Maryland Mass Transit Administration Baltimore, Maryland

Mr. Waesche discussed value engineering in the context of

the MTA's conventional and turnkey projects. Typically value engineering is executed at the 30 percent stage of conventional major capital projects. An example of value engineering in a conventional project is the \$300 million, 1.5 mile, two-station subway extension project. In this instance value engineering led to a reconsideration of assumptions regarding the community acceptance of the construction staging for the subway tunnel. This resulted in a revised construction staging and a \$4 million saving to the project. Overall on the project 38 value engineering proposals, resulted in 32 VECP's and \$14 million in savings to the project. The MTA shared these savings with the contractor.

The Baltimore LRT extension is design-build and one of the FTA Turnkey Demonstration Projects. The civil design was approximately 30 percent complete and the systems engineering was 80 percent complete at the implementation of the turnkey procurement. MTA considered the turnkey as value engineering and sought and received a waiver from the FTA concerning its (FTA's) value engineering guidelines. MTA pro-actively accepted contractor initiated value engineering cost savings as an incentive for the contractor to produce the project within the specifications (i.e., time and costs) advertised by the owner. In course, the turnkey contractor developed a \$300,000 cost savings on civil works that benefited the contractor. Correspondingly, the MTA's position is if the turnkey contractor experiences an unfavorable cost element, the adverse costs will be borne by the contractor.

In summation, Mr. Waesche observed:

The purpose of design-build methodology is for the Owner to assign responsibility for proper delivery to a single business entity. The goals of design-build are to speed project delivery, reduce costs and encourage innovation.

Value engineering is not appropriate in design-build projects because the Owner has selected a contracting methodology that encourages innovation. If VE is included, it seems that the Owner then tries to take undue economic advantage by insisting on sharing the cost savings generated by the design-build team.

If VE is included in design-build, does it mean that the Owner is responsible for additional costs if his concept plans or preliminary plans do not work? Including VE in design-build is suggestive of traditional design-bid-build.

Design build is a fast-track contracting technology. In the time required to analyze a VE proposal the designbuild contractor would be forced to withdraw the VE effort to keep the project on schedule.

Frank Turpin Vice President Bechtel Infrastructure San Francisco, California Mr. Turpin's presentation focused on issues affecting the price of turnkey projects. Turnkey projects were noted to vary, with few projects sharing the same approaches. Four issues that affect the price of turnkey projects were focused on for consideration: structuring the team, the preliminary engineering basis of the bid, owner provided design, and the value engineering process internal to the contracting team.

The nature of turnkey projects requires the formation of teams consisting of civil design, vehicle manufacture, and operations and maintenance specialties. The specialties have different interests which must be reconciled. Where there are uncertainties, contingencies or contract exceptions result. The nature of teaming limits the competition to a few companies (teams) and this can lead to higher prices. An owner-industry review process is critical. This review process encourages discussions between the owner and the contracting team resulting in confidence building within the contracting team and between the owner and the contracting team.

The design basis provided to the contractor for bidding purposes is a second area of concern. The design basis takes the form of a performance based specification or a preliminary engineering package for bid. FTA generally encourages advanced preliminary engineering but many transit agencies can not warrant the preliminary engineering validity. The turnkey contractor can either repeat the preliminary engineering or accept the owner preliminary engineering basis and accept the risk of errors and claims. Accepting the performance specification leads to errors in interpretation and the high cost of bidding. Neither of these options is acceptable. A middle ground between preliminary engineering and performance specifications is recommended for consideration.

A third consideration is aspects of a turnkey project for which the owner provides a completed design. This is characteristic of extensions of existing systems or where the owner has a preferred mitigation approach. Several BART examples were referenced. These areas are promising for the application of value engineering. Value engineering is important relative to the turnkey contractor's ability to reduce costs. The owners unwillingness to accept value engineering changes to completed design assumptions can result in added costs.

Value engineering internal to the turnkey team is important relative to the ability of the team to reduce costs. Value engineering in a turnkey project will focus the design consultant. In a conventional project, the design consultant has no incentive to engage in value engineering except to the degree that it affects the design consultants reimbursable costs. In turnkey projects, Bechtel is considering returning a portion of the value engineering saving to the design consultant. The return to the design consultant must be adequate to provide an incentive for value engineering savings. Mr. Turpin recommends that approximately 20 percent of the value engineering cost saving should accrue to the design consultant.

In turnkey projects, the contractors pricing is driven by the expertise and innovation that can be brought to the project rather than cost competition or profit limitation. Owners must encourage innovation and trust for the success of turnkey projects.

Sergio Gonzales Executive Director Highway and Transportation Authority Puerto Rico Department of Transportation and Public Works San Juan, Puerto Rico

Mr. Gonzales recognized the consistency of value engineering (VE), total quality management (TQM), and other quality related approaches. Value engineering as representative of quality optimization, applies to both the design and the construction stages of transit projects. Relative to turnkey with value engineering, conventional projects have several limitations:

 In conventional projects there is a tendency to use the familiar and provenduring design, and a reluctance to consider change. In this context, value engineering, in conjunction with turnkey approaches, can optimize cost savings.

 During construction contractors are limited by the design. Depending on how contractor initiated changes are handled, accepting value engineering based contractor changes can have the effect of limiting competition.

Traditional value engineering when applied to turnkey contractors may not provide adequate incentives to designers. There must be a benefit to the designers for incorporating value engineering proposals.

In Tren Urbano, value engineering was expanded to the procurement process to include: program standards, peer review, industry outreach, procurement law and regulations, and contractor recommendations. The solicitation process in Tren Urbano included: initial proposal evaluations for technical proficiency

price consideration for all technically sufficient proposals

joint evaluations of technical and cost proposals

optimization phase detailed negotiations and evaluations involving the proposers and the Authority

requests for best and final proposals.

Mr. Gonzalez observed that while the value engineering procurement approach has been successful in resulting in life cycle cost savings, there have been both positive and negative comment from contractors. As applied in Tren Urbano, value engineering has resulted in over \$50 million in cost savings. Several specific value engineering cost savings include communications, train control, power, station finish elements, warrantees, insurance and risk allocation.

In summary, the speaker concluded that:

• the objective of value engineering is to optimize the entire project procurement and implementation

- the turnkey process must continue to be evaluated
- the turnkey project approach is value engineering.

Discussion

There were several comments and questions relative to the extent of owner and contractor shares of the cost savings generated by value engineering. The consensus of the participants was that the conventional 50-50 split between owners and contractors for initial savings was tradition rather than equity. It was further the consensus that there is no clear answer as to what is a fair allocation of the value engineering savings, particularly with regard system wide and industry wide value engineering generated savings.

It was noted that it is difficult to quantify time savings as related to value engineering outcomes. Several of those present cautioned conservative quantification of the savings derived from value engineering. Nevertheless, it was repeatedly stated that value engineering results in significant and substantial savings over the life of conventional and turnkey projects.

Environmental Managment Functions	Who Completes NEPA Process?	Who Designs Mitigations?	Who Determines Sharing of Costs/Risks?	Who Obtains Needed Permits?	Who Monitors Environmental Compliance?	Who Conducts Construction Impact Outreach?	Who Evaluates Late Design Change Environmental Impacts?
Traditional Procurement	Owner, for U.S. DOT	Owner	Owner	Owner	Owner and U.S. DOT	Owner	Owner
Limited Turnkey	Owner, for U.S. DOT	Owner	Owner	Owner	Owner and U.S. DOT	Owner	Owner
Turnkey	Owner	Owner	Owner	Turnkey Contractor	Owner and U.S. DOT	Turnkey Contractor	Turnkey Contractor
Super Turnkey	Owner	Owner and Turnkey Contractor	Owner and Turnkey Contractor	Turnkey Contractor	Owner and U.S. DOT	Turnkey Contractor	Turnkey Contractor
Four-Phase Turnkey	Owner with Input from Turnkey Contractor	Turnkey Contractor with Input from Owner	Turnkey Contractor and Owner	Turnkey Contractor	Owner and U.S. DOT	Turnkey Contractor	Turnkey Contractor
Franchise	Turnkey Contractor with Input from Owner	Turnkey Contractor	Turnkey Contractor, with Input from Owner	Turnkey Contractor	Turnkey Contractor for Owner; and U.S. DOT	Turnkey Contractor	Turnkey Contractor

FIGURE 4 Typical roles and responsibilities.

Source: Mendes, Diana, "Environmental Considerations," <u>Lessons Learned—Turnkey Applications in the Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. VI-13

Session 5-Environmental and Risk Management Considerations

Session Chair:

Frank M. Russo Senior Director, New Rail Construction New Jersey Transit Newark, New Jersey

Session Highlights:

Pursue innovative approaches in environmentalmanagement, such as performance based financial incentives, collaboration with the community with regards to mitigation measures, and agreements with agencies that address the review process, minimizing paperwork and cost to all parties.

• Avoid unresolved environmental issues, since they result in higher risks which in turn result in higher costs. An effort should be made to understand risk probabilities. Establish a proactive environmental management process early in a turnkey procurement process.

In a turnkey procurement process, risks must be clearly explicit. There are different methods available to manage risk. A methodology for managing risk was presented. A flow-chart process was also presented to help in the process of identifying and managing risk. The different types of risks were discussed with suggested strategies to manage them.

In an effort to foster and direct community participation in transit projects, the Livable Communities Initiative Program was established by the FTA in 1994. A video was presented showing how communities got involved and challenged projects through legal actions in the Los Angeles area. Public Participation/Community Participation should have an active role in every phase of a transit project.

The industry is currently developing insurance policies that would protect design liability. Currently, sureties are applicable only in the construction phase of a project. They are also investigating the possibility of Phase Contracting where the owner accepts the risk in the design phase and the sureties cover the construction phase of the project.

Presented the contractors' perspective in Risk Allocation: How well companies identify, manage, and mitigate risk directly impact their bottom line. Risk allocation must be balance between the public and private sector. Risks must be placed where they can best be managed. For example, contractors are not well equipped to take on the risks related to the environmental component of a project.

Explained the BART's experience with the environmental considerations in the extension to the SFO airport. Faced many challenges with respect to stricter regulations, natural conditions (wetlands, threatened and endangered species), negotiations and coordination with the SFO International Airport, and negotiations with other agencies. BART has always taken the position that the responsibility and risks associated with environmental considerations remain always with them. To ensure compliance by the contractor, BART educates the contractor with regards to environmental concerns, provides the contractor with detail specifications that include agreements with the concerned agencies, and monitors though independent inspections.

 Presented the consultant's perspective with regards to environmental and risk management considerations. The role of a consultant is to identify clients that have a sound commitment to complete projects. One must know the playing field; understanding clients, stakeholders, and regulatory framework. One must push the limits by understanding best practices, relating innovation to established objectives, and valuing good design.

Diana Mendes BRW, Inc. Newark, New Jersey

Ms. Mendes presented the "Environmental Considerations" resource paper which she co-authored with Paul N. Bay and William D. Byrne for the session. Her presentation discussed how environmental and community issues affect project planning and development. Means are proposed to proactively manage the environmental compliance process to capitalize on the flexibility and advantages of a turnkey approach while reducing the potential for major project risk factors to jeopardize successful project implementation. Case studies of traditional and turnkey projects were reviewed to develop recommendations for successful turnkey execution.

The project development process (System Planning; Major Investment Study; Preliminary Engineering; Final Design and R-O-W Acquisition; Construction, and Operation) were discussed and examined relative to the integration and coordination of the National Environmental Policy Act of 1969 (NEPA). This was introduced as a "framework in which to develop transportation improvements which are integrated into the fabric of the host communities and which are supportive of community planning goals." The conduct of project development in the context of traditional and turnkey project approaches was considered (see FIGURE 4). Differences in projects relative to the specificity and range of alternatives at varying stages of project development and the affect of these factors on the conduct of the NEPA investigations of the social, economic and environmental (SEE) factors was examined.

An overview of procurement process options was presented including traditional, limited turnkey, turnkey, super turnkey, four phase turnkey and, franchise. The environmental management considerations in design-build projects were discussed and examined in the context of traditional and turnkey project case studies.

The lessons learned are:

• "Contingencies must be provided in the project budget and schedule to deal with inevitable project design changes. This is true in conventional procurement, but more so in turnkey procurement options."

Environmental considerations and the prospective impacts of the project may influence the selection of an

appropriate procurement process.

Assign responsibility for environmental management functions to the parties who are best equipped to resolve the issues that are likely to arise at each stage of the project development process.

 In turnkey projects, address environmental issues early and clearly define responsibilities for environmental processes.

Honor previous steps and agreements in the project development process. The further in the process changes are made the more costly they become.

 Innovative approaches in environmental management could benefit turnkey procurements. These include:

- Performance standards could be used to encourage avoidance of protected resources and community features through the use of financial incentives.
- (2) Development of area-wide enhancement banks to which turnkey projects could make a financial or 'project' contribution to satisfy mitigation needs.
- (3) Development of programmatic agreements with key federal and state resource agencies at the project outset to increase control over public agency review periods and to streamline documentation requirements.

• Avoid unresolved environmental issues since they result in higher risks which in turn result in higher costs.

An effort should be made to understand risk probabilities.

Establish a proactive environmental management process early in a turnkey procurement.

The major project risk factors related to the environmental process involve cost, delay and public relations risks. Independent of whether a traditional or turnkey procurement is selected, all of these risk factors need to be considered. For some risk factors there may be advantages to the turnkey approach, while for others turnkey may be disadvantageous.

Douglass B. Lee

Volpe National Transportation Systems Center U.S. Department of Transportation Cambridge, Massachusetts

Mr. Lee's presentation paralleled the resource paper "Identification and Management of Risk on Turnkey Transit Projects" which he prepared for the workshop. Comparing turnkey and traditional procurement, two characteristics are recognized:

(1) Turnkey procurement requires making risks

explicit.

(2) Different risk control methods are used with turnkey.

Risk can not be eliminated, it can only be minimized. Risk is always present at some level. Achieving risk minimization requires the management of risk. A flow chart process was presented to help in the process of identifying and managing risk.

Uncertainties, unknowns, and unforeseen events are inherent in capital construction projects. Nineteen risk categories were recognized: political, funding, financing, right-of-way, speculative effort, bids exceed estimates, geotechnical, hazardous material, underground utilities, inflation, application of government regulations, permit approval, changed requirements, design and system integration, construction performance, acts of God, operating risk, market risk and, contested conditions. The allocation of these risks between the owner and the contractor is considered (see FIGURE 5).

Risk management instruments were introduced and examined relative to their application to transit projects.

Risk	Owner	Contractor			
Political	full				
Funding	full	may participate			
Financing	full	may participate			
Right-of-way	full	up to full			
Speculative Effort	before RFP	before RFP			
Bids exceed estimates	full				
Geotechnical	discretionary	discretionary			
Hazardous materials	discretionary	discretionary			
Underground utilities	discretionary	discretionary			
Inflation	prior to award	after award			
Application of government regulations	regulatory changes only	full compliance with existing regulations			
Permit Approval	traditional	may participate			
Design and system integration	traditional	turnkey			
Changed requirements	full				
Construction performance	may share	full			
Act of god (force majeur)		full (insurance)			
Operating	Design-Build	Design-Build-Operate			
Market (ridership or revenue)	Design-Build	Design-Build-Operate			
Contested decisions	partial	partial			

FIGURE 5 Risk allocation to participants.

Source: Lee, Douglass B., "Identification and Management of Risk on Turnkey Transit Projects," <u>Lessons</u> <u>Learned—Turnkey Applications in the Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. III-18

Frank E. Enty Interim Executive Director Conference of Minority Transportation Officials Washington, D.C.

Mr. Enty discussed the role of community participation and consensus development on successful turnkey project development. The FTA Livable Communities Initiative program was introduced as an innovative effort to foster and direct community participation in transit projects. A video was presented showing how communities became involved in transit project planning and challenged projects through legal actions in the Los Angeles area.

Mr. Enty discussed the importance of public involvement in the transportation planning and project development processes. The development of community consensus and support for important project elements was presented. Active community participation throughout all phases of transit project development was advocated as a mechanism to engender broad public support and minimize project opposition.

The presentation closed with the caution that projects which fail to involve broad public involvement and community participation are vulnerable to public opposition and the risks of political uncertainty.

Lynn Schubert President, The Surety Association of America Iselin, New Jersey

Ms. Schubert discussed the challenge of liability protection for turnkey projects in which the design-build-operate responsibilities are covered by a single agreement with a private consortium. Design liability is not covered by surety bonds. Construction liability and performance are protected through surety bonds. Turnkey projects may be denied surety bonding because of the complex design-build contract where construction responsibility cannot be separated from design responsibility. It was proposed that phased turnkey projects could facilitate surety bonding. In the phased approach, during the initial design phase, the owner could accept the design risk and no surety bond would be necessary. The construction stage would be the second phase of the turnkey where surety bonding would provide construction liability protection. The Surety Association of America is currently working with the New Jersey Department of Transportation to explain the turnkey process to the contractors in that state.

The need to increase the understanding of design-build was stressed. An example was drawn from New Jersey, in which legislation to facilitate a design-build project was resisted by contractors because of inadequate understanding of the turnkey concept. Ronald W. Oakley President, Infrastructure Operating Company Fluor Daniel, Inc. Greenville, South Carolina

Mr. Oakley emphasized that risk management is part and parcel of the practice for private design and construction companies. Companies which manage risks well survive. Companies which do not manage risks well do not survive in business. The allocation of risk is an important aspect of risk management.

While there are many kinds of risk (Fluor, Inc. has detailed as many as thirty-five kinds of risk), Mr. Oakley defined four major categories of risk; political and regulatory, contracting, financial (including funding and debt service), and execution. In turnkey projects, the allocation of risks between the public and private participants to achieve a balance is the goal. In general, risk should be placed where it is best managed.

Several examples of risk allocation were considered. It was noted that political risk as exemplified by legislative changes can be costly to companies conducting business in the uncertain legislative environment. Right-of-way acquisition (risk) is not appropriate for private companies that do not have the power of eminent domain. Design and build risk can be borne well by private contractors. Permit approvals are complex and varied. Some permits can be the responsibility of the private contractor. Other permits, most notably environmental approvals, should be the responsibility of the public owner. The uncertainties attendant to environmental permits requires a high risk cost in the related contracts.

It is important to make the risk explicit early in the turnkey procurement process.

Ellen Smith

Construction Engineering Agreements Manager Bay Area Rapid Transit District Oakland, California

Ms. Smith reviewed the environmental, administrative and regulatory requirements governing an 8.2 mile, \$1.2 billion extension of a Bay Area Rapid Transit Line through five cities into the San Francisco International Airport. The project's complexity was reviewed including the intensely developed urban complex (crossing and parallel transportation features) through which the corridor travels and the sensitive natural environmental features and resources (i.e., wetlands, endangered species) that must be negotiated. In the instance of the airport, construction on the airport property is the responsibility of the airport as a contractor to BART.

The speaker noted the rigorous provisions of the

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California Environmental Quality Act with strong mitigation requirements that carry the force of law. An open challenge to BART is how to achieve environmental compliance through its contractors. The environmental permitting has resulted in detailed specifications affecting design and construction.

Several innovative measures were discussed to achieve environmental compliance:

 Training of contractors: BART will train the contractors personnel regarding the measures and mean necessary to comply with environmental requirements, and

• Contractors will have an environmental monitor on their staff to assure conformity with the permit terms.

 BART will monitor contract environmental compliance with independent inspections.

Joe Aiello Vice President Frederic R. Harris, Inc. Boston, Massachusetts

Mr. Aiello discussed risk management from the perspective of the contractor. The contractor wants a client that is committed to the project with the fortitude and resources to see the project through completion. The contractor's risk management necessitates that the contractor: know the playing field; push the limits, and understand that there is no free lunch. These terms were expanded on:

Know the playing field—The contractor must understand the client, the relevant stakeholders, and the regulatory environment. In addition, the contractor must have a clear understanding of the project's objectives.

Pushing the limits—This means that the contractor must know the best current practices, relate innovation to the project's objectives and value good design.

No free lunch—This recognizes the importance of project planning, community participation and a reasonable allocation of risks between the contractor and the owner.

Mr. Aiello considered the particulars in the context of the Tren Urbano project. where he noted that the project planning had continued for a number of years resulting in a preliminary light rail alternative before finalizing on a rapid transit project. The interest of the client in fast tracking the project's completion, with the maximum local design-build content, resulted in an owner-consortium contractor agreement with clear accountability between the parities. Early hurdles included the project technology (light rail or rapid transit), right-of-way acquisition, and environmental approvals. The early decision on a strategic approach (designbuild) resulted in the contractor having a project development responsibility and perspective as contrasted to a more limited engineering perspective.

Mr. Aiello closed with the following recommendations and observations resulting from the Tren Urbano experience to date:

(1) An early Environmental Management Plan with clearly delineated responsibilities for environmental permitting is an asset.

(2) Remember to focus on the needs of the customer.

(3) The role of the government should include resolving the externalities, managing public involvement and environmental mitigation.

(4) The private sector responsibilities should include control of costs and schedule, and the management of the construction.

Frank Russo Senior Director New Rail Construction New Jersey Transit Newark, New Jersey

Mr. Russo addressed the New Jersey turnkey demonstration risk allocation. He noted that during the six month contract development phase following the contractor selection, the allocation of risks was fully explored, considered and defined prior to the contract agreement. The following risk allocations have been effectuated:

Agency (New Jersey Transit) risk assignment: environmental; geotechnical; wetlands; hazardous materials; political; funding of the design and construction; and community action.

Contractor risk assignment includes: schedule; finance of the vehicles; all performance requirements including, quality assurance and quality control, and operational performance.

Discussion

QUESTION: Should there be a policy decision to make the environmental process smoother for transit projects when compared to other types of projects?

ANSWER: The FTA approach of imposing environmental considerations early on is correct. The FHWA has a different approach allowing for environmental consideration after design, thus increasing the risk of litigation.

AUDIENCE: No agency will promote the relaxation of current environmental laws.

QUESTION: Were there any FTA funds involved in

the internal light rail project at the San Francisco International Airport?

ANSWER: No, this light rail system did not use any FTA funds. It was funded by the Airport.

QUESTION: Have there been any surety bonds issued for the operation phase of a transit system?

ANSWER: No, there is a type of bond called the maintenance bond that covers the contractors liability for 5 years after construction.

QUESTION: Can we do away with bonds in a turnkey procurement approach?

ANSWER: Bonds are required if the project is being funded by either the state or federal government.

QUESTION: Why don't Surety Companies move faster against contractors?

ANSWER: There is a vast difference in the responses of different sureties companies. The surety bond is a tri-party agreement and all responses have to be addressed and balanced this way. The Surety Association of America wants to spread the word on good experiences. Sometimes the company is called too late. The last thing a surety company wants to see is a default.

QUESTION: How do we protect the process from litigation at the very start?

ANSWER: By promoting agencies working together early on to resolve issues. All disciplines should be involved in the environmental process.

QUESTION: Is there something about a mass transit

project that makes it harder to assess risk?

ANSWER: The challenge of a mass transit project is the operations and maintenance phase with the systems and vehicles providers. The trend now is to organize teams in which the risks are distributed among the members.

QUESTION: Why did New Jersey choose a fifteen year operations and maintenance contract?

ANSWER: The agency thought it was a good approach since it established a long-term relationship in which the contractor/operator had to assume responsibilities for the success of the project. The agency made some revenue guarantees and asked the contractor to estimate the cost of operation.

QUESTION: Wouldn't early public participation generate more opposition to a project?

ANSWER: The opposition will be there, the earlier you deal with it the better. Ultimately, the people will be the customers and if you do not begin by being a good neighbor you will face problems later on. Public participation should be encouraged.

QUESTION: Regarding environmental concerns—How is ownership of the issue dealt with?

ANSWER: The agency is the owner of the process and ensures the contractor complies based on a partnership. As environmental concerns arise the agency should stand up and face them. Contractors are recognized as the primary mechanisms for allocating risks among the participants in transit projects.

TABLE 1									
Responsibility for Project Management Control									
Project Procurement Owner GEC Other Turnke Method Owner GEC Consultants Contract									
Baltimore CLRL Extensions	Modified Civil D/B	х		x	X				
BART San Fran. Airport Extension	Modified Civil D/B	х	x		x				
NJ Transit HBLRTS	Full DBOM	х	x	x	x				
San Juan Tren Urbano	Modified DBOM	x	x		x				
Baltimore CLRL Phase I	Conventional	x		x					
BART Colma Station Project	Conventional	х	x						

Figure 6 Responsibility for project management control.

Source: Schneck, Donald C., and Stross, R. Andrew, "Project Management Control Resource Paper," <u>Lessons</u> <u>Learned—Turnkey Applications in the Transit Industry</u> (Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation, October 1997) Pg. III-18

Session 6 - Project Control

Session Chair: L.G. (Gary) Byrd Consulting Engineer Alexandria, Virginia

Session Highlights

The role of the turnkey contractor is a new consideration in project management and control.

While the roles of the agency/owner, the designer and the contractor are well established on conventional projects, turnkey projects may require different project controls depending on the turnkey approach and conditions.

 In the FTA Turnkey Demonstration Projects the innovative procurement necessitated additional control measures as contrasted to conventional procurements.

There are examples of minimal project controls on turnkey highway projects with complex systems components. These should be analyzed for their applicability to transit capital projects.

• The owner's management philosophy, teaming approach, and the quality and competence of the turnkey consortium all influence and impact the degree and type of project management control.

Don Schneck Senior Associate Booz-Allen & Hamilton, Inc. Philadelphia, Pennsylvania Mr. Schneck presented the resource paper "Project Management Control" which he co-authored with R. Andrew Stross. The paper focuses on project management control as it was achieved in the five FTA Turnkey Demonstration Projects (see FIGURE 6). The goals were to document the key issue areas encountered in project management for turnkey projects; describe the extent of control functions utilized; and highlight the initial lessons learned in projects.

The analysis focused on the evolving process of achieving reasonable balances for the roles of each of the major project organizations and the extent of project management control functions assigned to the roles for:

- Schedule Management and Control
- Progress Payments
- Cost Control and Job Accounting Systems
- Technical and Scope Configuration Control
- Change Orders and Claims Management
- Quality Assurance/Quality Control Program
- Owner Monitoring/Contractor Reporting

Subcontractor and Disadvantaged Business
Enterprise (DBE) Management

- Escrowed Bid Documentation
- Verification/Close-out and Project Delivery.

Mr. Schneck indicated that turnkey procurement introduces a new perspective on a traditionally well defined process that must be addressed in determining the level of management control—the role of the turnkey contractor and agency. The turnkey contractor is given responsibility for overall project execution, including assuming selected roles in project management typically reserved for the owner agency staff and/or consultants.

The FTA turnkey projects were considered to have an high overall level of project control by the owner agency for the information and systems aspects of management. Other functions of project management, such as project scheduling, quality control, systems integration and configuration control, are shared with the contractor at varying levels of responsibility depending on specific local preferences, agency capabilities, and other project influences.

Project management control systems have been used to provide a mechanism for owner agencies to retain visibility over a turnkey project that is provided by agency staff on a more conventionally contracted project. Increased monitoring functions which require more detailed cost, payment, progress and schedule reporting have been used to enhance the owner's communication with the turnkey contractor. Enhanced project management requirements can serve as a means for the owner to retain an informational control over the project at the key decision points while still providing the increased allocation of risk and responsibility to the turnkey contractor.

It was observed that the extent of management control for each project was influenced by the developmental conditions of the project and the capability of the agency owner. The combined owner and contractor resources applied to the various management control functions are a function of local area, agency and the project particulars, including:

- nature of the project
- project size and scope
- owner staff experience
- right-of-way location, and
- whether the project is a new start or an extension.

It was further observed that complex turnkey projects, such as design/build/operate/maintain contracts, typically have a higher level of applied resources and systems control by the owner as contrasted to lower cost and less complex civil design-build contracts. The level of project management control can vary between management functions within the same contract.

FTA has recently provided owners with increased flexibility and authority to modify project management practices. This has resulted in eased procurement and administrative requirements for grantees, with benefits for both turnkey and conventional projects. Several areas for potential refinement particular to turnkey projects are:

More unique agency/contractor payment methods

(i.e. the New Jersey Transit turnkey demonstration project). This may require further consideration of the progress payment reporting mechanisms outlined in FTA's Third Party Contracting Requirements.

• The FTA value engineering requirements (Grant Management Guidelines) may need to be modified to account the inherent value engineering incentives in the turnkey contract structure.

• Further research into existing lease and equipment management guidelines presented in FTA's Grant Management Guidelines (FTA Circular 5010.1B). This may identify issues regarding satisfactory continuing control and monitoring of FTA funded assets under turnkey projects.

Project Management Plan requirements may benefit from selected revisions to better accommodate turnkey issues of contractor roles in project management, with attention to schedule monitoring and QA/QC programs.

The timing of the full-funding grant agreement for turnkey projects must be moved forward in the project development process to follow preliminary design. The Federal funding commitment can be reflected in the turnkey project finance plan and procurement process to broaden contractor interest and competition.

While turnkey projects undertaken in the U.S. to date have evidenced a variety of assignments of management control responsibilities, several trends are developing toward a preferred approach. The lessons learned to date include:

• While several factors influence the level of project management control, the more complex and longer term contracts demonstrate a higher level of pre-planned management systems control by the owner;

Development of project management roles and responsibilities should receive significant attention prior to the development of the procurement process, with clear definitions of the owner and the contractor responsibilities.

• Combining schedule management, progress payments, and cost control through the cost-loaded schedule process can provide owners with a high level of monitoring while streamlining the required resources for the overall project management process.

• The bid documents should carefully define the QA/QC program so that the participating owner and contractor can avoid conflicts of interest. The owner may have to monitor closely initially to ensure the program is functioning properly.

• The complexities of turnkey contracts require additional levels of reporting and/or detail by the contractor team and a more thorough review by the owner to ensure compliance with specifications and progress.

 Turnkey projects may require the owner to raise the threshold amounts for change orders/claims requiring senior staff approval so that staff have the necessary authority to advance the project and make decisions at the appropriate level of the organization

Geoffrey A. Fosbrook, Project Manager GMAEC Tren Urbano San Juan, Puerto Rico

Mr. Fosbrook's presentation focused the Tren Urbano project and the project management control measures which have been incorporated in the project. Tren Urbano was selected in 1993 as one of five FTA Turnkey Demonstration Projects. Mr. Fosbrook started by noting how the procurement strategy has influenced the project management controls. Tren Urbano is in the first of four possible phases. The GMAEC is completing studies for the first extension and following the Authority's review will be conducting the major investment and environmental studies for the extension.

Phase I was explained to include a 17 kilometer heavy rail system guideway, with 14 stations and a maintenance and storage yard. Half of the alignment takes advantage of existing R-O-W, with sixty percent of the alignment elevated and the remaining portions at-grade. The capital cost is estimated at \$1.25 billion and estimated year 2010 ridership is 114,000 passengers per day.

Mr. Fosbrook discussed the Authority's consideration of several implementation alternatives. In deciding on a procurement, he noted that the Authority's most important activity was to decide on the risk which it wished to accept in the joint development and the risk it would pay the contractor to accept. The Authority desired for the contractor to have responsibility for initial operations and maintenance, and to have maximum participation by local designers and contractors. This led to the decision on a modified turnkey system contract with six separate design/build civil packages. The decision increased the coordination responsibility of the Authority while satisfying the other objectives.

In July 1995 the Authority adopted legislation which enabled the procurement of design/build contracts under a two step competitive negotiation process. The issuance of the Request for Proposals was accompanied by other documents which outlined the detailed requirements, the proposal evaluation process and contract documents. It is believed that this process greatly facilitated the proposal development. The documents defined the project management controls that would be adopted during implementation of the project. These included requirements for configuration management, design reviews, document control, schedule reporting, progress reporting and the work breakdown structure to be used for schedule and cost tracking. Multiple contractors required standardization in reporting elements and formats which were all spelled out in the procurement documents.

In considering the systems and test track turnkey (STTT) contract an Interface Control Manual (ICM) was required to aid in the coordination of the six design/build civil contracts and the STTT turnkey contractor. The Authority outlined the ICM as part of the STTT procurement documents. The road map for uniform tracking and reporting of schedule and cost was established by the Authority through various levels of the work breakdown structure (WBS).

A summary level schedule was established by the Authority early in the preliminary design and procurement process. An analysis of the schedule relationships among the contracts was conducted by the GMAEC and incorporated into the procurement documents. All contractors are required to submit their schedules in a Primavara P3 format. These are merged in the overall project schedule. The STTT contractor has responsibilities pertaining to schedule, design and construction tracking regarding the alignment section contractors. All contractors are required to present a schedule of values which are derived from the cost loaded schedule. A monthly progress report is required to be submitted along with the application for payment.

Mr. Fosbrook closed by noting that in addition to project management controls that are typical of conventional transit project design and construction, innovative procurement has necessitated additional control measures. Many of these additional control measures are incorporated into the Interface Control Manual. The STTT contractor has important coordination responsibilities. More is expected to be learned as the project progresses.

Gregory G. Henk

Executive Vice President for Design and Construction Transportation Corridor Agencies Santa Ana, California

Mr. Henk discussed the Transportation Corridor Agencie's (TCA) experience in turnkey highway project development and the relative performance of the Agency's three turnkey highway projects, as a group, with Orange County's largest toll highway projects.

The three turnkey projects discussed were the San Joaquin Hills Transportation Corridor, the Eastern Transportation Corridor and the toll collection and revenue management system. TCA is comprised of two public toll road agencies with a single (TCA) staff administering turnkey projects in behalf of the agencies building three roads. San Joaquin Hills Transportation Corridor Agency (SJHTCA) is one agency building a toll road that is nearing completion in approximately one month; a segment opened to traffic in July 1996. The SJHTCA is three and one half months ahead of schedule. The Foothill/Eastern Transportation Corridor Agency is a separate agency, made up of two corridors. The Foothill corridor has partially completed and opened two traffic segments in 1993 and 1995; a third segment is under construction. There is a fourth Foothill Segment that has not received environmental clearance. A design-build contractor is being selected for the fourth segment. Once selected the contractor will participate in the environmental clearance. The Eastern Transportation Corridor is included in a single design-build contract.

TCA has issued \$2.7 billion in debt and has \$2.2 billion in contracts at this time. TCA has a number of financial partners including:

 FHWA with \$220 million in lines of credit (ridership contingency), \$25 million in construction contingency and no actual cash;

 Caltrans with a major financial stake although not specifically valued. Caltrans is responsible for maintenance, owns the competed roads, is responsible for tort liability and has some cash contribution;

 local governments who collect developer impact fees (\$130 millions collected to date and \$500 million projected over the life of the bond);

- bonds;
- developers through rights-of-way;

contractors in subordinated debt accepted in lieu of cash payment;

 value engineering through the contractors worth about \$50 million to date;

- state gas tax (STPP);
- state general funds; and
- a contractor line of credit.

For the SJHTC, the bonds are the bulk of the funds, however state gas tax revenues, state general funds, and project revenue certificates are the important finance elements. In the ETC with \$1.5 billion in financing, the bonds are most important. These include fixed and variable rate bonds leveraged by tolls, development impact fees, lines of credit and state funds. SJHTC was the largest U.S. design-build until the New Jersey Transit Turnkey Demonstration project. The ETC project is second in size to SJHTC in the size of the design-build for a domestic U.S. project.

Mr. Henk referred to the \$600 million design-buildoperate-maintain project which TCA has with Lockheed-Martin IMS to implement a toll collection and revenue management system (TCARMS) for the agency's toll roads. The TCARMS contract is performance based while the other turnkey contracts were technical requirements driven. The TCARMS is in place on fifteen miles of existing TCA roadway.

The TCA turnkey projects have performed very well to date when compared with other, conventional, Orange County projects. TCA has an engineering staff of six. TCA is a risk adverse organization; they stay out of the risk loop totally. The organization feels strongly that time is money. The contract timing agreements are rigidly enforced with severe penalties for delayed completion.

Douglas R. Campion Principal Transit Sverdrup Civil, Inc. St. Louis, Missouri

Mr. Campion reviewed and emphasized important factors related to design/build project management and control. The overarching importance of developing an operational teaming perspective was discussed. Teaming must involve all stakeholders and all the stakeholders must accept that responsibility. It is not the owner's responsibility to manage the turnkey subcontractors. The owners responsibilities include ensuring the technical qualifications of the project participants. Key systems and project criteria must be defined early, incorporated into the procurement process, and understood by the turnkey contractor and all subcontractors. The project criteria should include design requirements, important specifications, and sign-offs.

Scheduling and schedule requirements must be well defined. Interfaces must be laid out so that the sequencing and timing of deliverables are understood. Detailed agreed upon milestones must be defined early. Very important is holding to the schedule delivery date established in the initial schedule. Expenditure reporting and the basis for payments require resource reporting and price loaded schedules. Schedule and cost monitoring are important to expediting the processing of payments.

The QA/QC requirements are challenging. Plans must be developed in conjunction with the contacting community to see that the QA/QC processes of the contractor ensure the requirements of the owner. This was recognized as a difficult area for owners who are not trusting of the QA/QC processes and intentions of contractors. The QA/QC process should be relatively independent of the other aspects of the turnkey process to ensure a strong independent judgment.

It is important to have a formal partnering agreement, not just with the contractor but also with other tangential agencies whose involvement is necessary. The following synopsis summarizes some key findings and observations that were discussed at the workshop. They are not, however, "consensus" findings or recommendations of all the participants, and should not be construed as such.

Session 1, Part 1: Transit Turnkey and Joint Development–Dennis J. Newjahr

Joint development and transit turnkey require:

- (1) Common, clear and precise goals and objectives
- (2) An understanding of the market
- (3) Understanding the capabilities of the partner
- (4) Flexibility
- (5) Public and political support, and
- (6) Creative teaming.

Session 1, Part 2: Transit Turnkey and Joint Development -Carlos A. Colon

Finance is the most important consideration in turnkey and joint development.

(1) Argentina is breaking new ground in undertaking station renewal through joint development arrangements.

(2) Paris' Chatelet-Les Halles and Forum demonstrate the potentials for joint development and turnkey project success.

(3) There are problems and limitations posed by vendor financing.

(4) There are endemic problems with the U.S. transit industry that severely constrain its ability to meet debt service requirements.

(5) The private sector is interested in investments where debt recovery and profits are possible.

(6) Joint development complements with livable communities and can contribute to the finance of transit investments.

(7) We must reconsider the commonly held view that improved transit can only result in greater deficits.

Federal Transit Administration's Perspective–Edward L. Thomas

Transit turnkey and joint development are promising developments for undertaking transit projects. They require encouragement and further study. Notable features of turnkey are the elimination of the "hand-off" between project stages and the emphasis on teaming.

The turnkey approach is important to undertaking transit projects in a more expedient manner leading to lower capital costs and fewer change orders and contract difficulties. There is a pipeline of major transit project proposals and an increasingly constrained federal budget. Transit turnkey and joint development can advance major transit investment projects in this time of federal fiscal constraint.

Session 2: Procurement and Subcontracting-Subhash R. Mundle

Five categories of conclusions were identified:

Category A: State Law and Turnkey Procurements

There is no total prohibition of turnkey procurement. States vary relative to turnkey eligibility.

Category B: Turnkey procurement bidding and negotiation

Turnkey procurement should be a two step process. The lowest bid is not adequate to demonstrate the ability to undertake the project in a manner responsive to the owner's requirements and subtleties.

Category C: Turnkey procurement process

Turnkey requires rethinking the procurement process to result in a procurement that selects the best contractors considering the project requirements and the owner preferences.

Category D: Participation by small and minority businesses

Turnkey has the potential for reducing the contracting opportunities for disadvantaged, small, and medium sized contractors.

Category E: Performance Standards

On-time, within budget performance is an essential requirement for turnkey.

Session 3: International Turnkey Experiences and Development: Lessons Learned-Tony Yen

The lessons learned from the international turnkey experience include:

 Build, operate, and transfer arrangements emphasize

accessibility over mobility

Scheduling is a consideration of primary importance

Project owners must have a solid financial plan

Cooperation within the team is important

• Savings potentials can be expected in the range of thirty percent for costs and two years in a typical five year project.

The Buenos Aires Metro in Argentina posed the interesting possibility of the government maintaining ownership of assets while contracting for operations. Successful turnkey requires a clear allocation of responsibilities, and shared goals and trust among the participants.

Session 4: Value Engineering-Nuria I. Fernandez

It is necessary to define what is, and what is not, value engineering (VE). In addition:

VE should contribute significantly to the project;

VE identifies savings in schedule and costs;

• VE requires a close working relationship among the participants to be successful;

VE should focus on high cost elements;

VE is itself low in costs and low in risks;

• VE consultants should share in the value engineering savings.

Does VE promote bait and switch management practices in turnkey projects?

Should the time savings resultant from value engineering be quantified and reimbursed?

• Value engineering must be initiated early in the project's development.

Session 5: Environmental and Risk Management Considerations–Frank M. Russo

The environment and turnkey can coexist; there are no insoluble problems.

Environmental issues must be addressed early.

Public and political support are critical.

• There are potential conflicts of interest if the turnkey contractor participates in the environmental process.

• There must be an equitable balance in the allocation of risks. The actual risk allocation will differ from project to project.

In general:

• Environmental risks are the responsibility of the owner

• Long term operations and maintenance risks must be shared

 Political and funding risks are the responsibility of the owner

Schedule and progress risks are the contractor's responsibility

Performance bonding requirements should be reconsidered.

Session 6: Project Control-L.G. (Gary) Byrd

Turnkey projects are characterized by multiple objectives that require, in each instance, appropriate management controls.

• The specific goals and requirements of each project affect the management and control strategies appropriate to the project.

 Management and information systems are important project controls.

• Standards and management control systems must be developed and implemented for each project.

• The responsibilities between the project owner and the contractor must be allocated reasonably. Owners must learn to let go of those controls that are integral to the turnkey contractor's responsibilities.

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