Managing Your Money: Project Delivery Methods

Public-private partnerships in passenger rail transit: A practical study of DB and DBOM

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In early 2004, at the request of the Seattle Popular Monorail Authority, Nossaman, Guthner, Knox, Elliott LLP together with Lea + Elliott, Inc., prepared a survey and report on design-build-operate-maintain (DBOM) projects in the passenger rail industry. Its purpose was to assess the wisdom of using this method for the Authority’s procurement, development and operation of the Green Line, a planned 14-mile, fully automated, urban grade monorail system to serve the City of Seattle.

The report may be the only systematic survey and evaluation of DBOM for transit systems currently available.

SCOPE OF SURVEY

By and large, regional governments and transit authorities opt to operate and maintain their passenger rail systems with their own forces. This is often the result of policy or legal issues regarding transfer of responsibility and risk for operations and maintenance, and labor relations. Still, the report confirmed that DBOM is both viable and advantageous for some passenger rail agencies, and in appropriate circumstances, placing the operating and maintenance responsibility on the private parties that design and build the system makes sense.

The report was based on a review of...
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**THE PROFILE:**
Gene Walker
Maintenance Division Manager
Golden Gate Transit District

**THE PROJECT:**
Re-power 63 coach fleet

**THE CHALLENGE:**
OEM out of business! Unable to source required, certified parts and struggling with an in-house rebuild...
- Rebuild required modifications that would void other warranties.
- No guarantee buses would be reliable after modifications.

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Staffers asking an exhibitor for technical advice discovered they offered certified “Off the Shelf” parts for the engines!

**THE SAVINGS:**
- Fix made for about $1,000/bus vs. $2100+/bus
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- Warranties on rest of engine parts were preserved

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available literature, interviews with various commentators on the subject and interviews with key officials regarding DBOM passenger rail projects, among them:

- Hudson-Bergen LRT and River Line LRT [formerly SNJLRTS]
- AirTrain JFK and Newark International Airport Automated People Movers (APM)
- Denver International Airport APM
- Las Vegas Monorail

The primary focus of these interviews was to determine the project owner’s level of satisfaction with DBOM and to obtain the benefit of any lessons learned relating to the O&M phase of the project.

Officials at public agencies that had made the decision to use design-build (DB) only to deliver their projects were also interviewed. The interviews sought to discover why these agencies decided not to use DBOM, as well as to ascertain how they assured project quality and dealt with system integration issues. These interviews concerned the following DB projects:

- Airport MAX (Portland)
- Hiawatha LRT
- Los Angeles to Pasadena Metro Gold Line
- T-REX (Denver)
- I-15 Reconstruction Project (Utah)

The primary reason cited for using DBOM is that it provides a powerful incentive for the team to build a high-quality system that will stand the test of time — thereby promoting the goals relating to project and service quality, as well as providing early certainty regarding O&M costs. By having the proposing teams bid on all aspects of the project as part of a single package, costs — including base operations and maintenance costs — are known upfront with a greater degree of certainty. This avoids a common problem often seen in large construction projects where budgets for construction, operation and maintenance are developed in the early design phase based on assumptions that later prove incorrect.

DBOM also ensures that the entity designing the project will be thoughtful about the expense of operations and maintenance, since inefficiencies affecting those aspects of the project will cut into its profitability.

Lastly, the DBOM approach is often used to minimize the challenges of start-up problems, claims and system integration often experienced by complex high technology projects in their initial years of operation.

**SURVEY FINDINGS: DBOM PROJECTS**

Most of the transit agencies surveyed strongly endorsed DBOM for passenger rail projects, indicating satisfaction with the results and/or interest in using DBOM on future projects. The agencies using DBOM generally perceived a number of benefits.

Though one agency official indicated some dissatisfaction with operations services, he thought that DBOM had resulted in a high-quality product. Another of the transit agencies surveyed indicated that it would not be interested in using DBOM in the future, but recommended DBOM for startup and small agencies.

Specific experiences from the project owners included the following:
- New Jersey Transit’s representatives felt that use of a single procurement for both DB and O&M resulted in a much better product, particularly since the equipment supplier was part of the DBOM consortium. On Hudson-Bergen, there was better integration than would otherwise be expected, although there were some integration problems on the River Line. The representative also felt that by using DBOM, New Jersey Transit avoided disputes between agency operating personnel and the contractor as to whether a problem was due to bad design or bad maintenance. The maintenance provided by the O&M contractor is much better than that on agency-operated systems.

Nonetheless, there have been problems in operations, including the contractor’s use of a commercial/financial approach to risk management affecting safety issues and slow response times.
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At a Glance: DB/DBOM in action

DBOM Projects:

HUDSON-BERGEN LRT DBOM PROJECT
Owner: New Jersey Transit, Newark, NJ 07105-2246 Phone: (973) 491-8960
Contractor: 21st Century Rail Corporation (including Washington Infrastructure Group, Itochu Rail Car and Kinkisharyo USA)
Single contract covering design, construction, operations and maintenance, awarded in 1995; 15 year O&M term
Manually operated light rail system. Initial 7.5-mile system has 12 stations and 29 articulated light rail vehicles. The initial operating segment opened in 2000. Six-mile extension added to contract in 2000, scheduled for completion in 2005

SOUTH JERSEY LRTS (RIVER LINE)
Owner: New Jersey Transit, Newark, NJ 07105-2246 Phone: (973) 491-8960
Contractor: Southern New Jersey Rail Group, LLC., a consortium led by Bechtel and Adtranz
Single contract covering design, construction, operations and maintenance, awarded in 1999; 15 year O&M term
Manually operated 34-mile diesel Light Rail Transit system in southern New Jersey, running along the Delaware River connecting Camden to Trenton on existing Conrail right-of-way for most of the line. System includes 20 station stops; more than 20 rail bridge/overpass structures, more than 50 grade crossings; an equipment, maintenance and yard facility; and the supply of vehicles.

PORT AUTHORITY OF NEW YORK AND NEW JERSEY: JFK AIRTRAIN
Owner information: Port Authority of New York and New Jersey, New York, NY 10003 Phone: (212) 435-6910
Contractor: ARTC, a joint venture of Skanska and Bombardier
Operating term is 5 years, plus two 5-year options. Approximate cost is $25 million per year.

Airtrain is an 8-mile, fully automated transit system, with three stations. Opened to revenue service on Dec. 18, 2003. Approximate one-year delay in start of operations due to accident during manual operations in testing. Both companies provided parent guarantees and agreed to joint and several liability through operating term.

Design-Build Projects:

DENVER T-REX PROJECT (DB)
Owner information: RTD - Regional Transportation District, Englewood, CO Phone (303) 357-8564
In 2001 CDOT/RTD awarded a $1.186 billion design-build multi-modal contract to a joint venture of Kiewit Construction Company and Parsons Transportation Group, Inc. The project involves improvement of approximately 17 miles of Interstate 25 and Interstate 225 in the Denver metropolitan area and adds approximately 19 miles of new Light Rail Transit line, including 13 new stations and improvements to the existing Broadway station. Completion is expected in the fall of 2006. Design is approximately 95 percent complete and construction is approximately 55 percent complete.

MINNEAPOLIS HIAWATHA LINE (DB)
Owner information: Minnesota Department of Transportation, Hiawatha Project Office, Minneapolis, MN, Metro Transit, Minneapolis, MN
The Hiawatha Light Rail project is an 11.6-mile line extending from downtown Minneapolis to the Minneapolis-St. Paul Airport through a tunnel built by the Metropolitan Airport Commission. The project serves 17 stations. The design-build contract for the project was awarded by the Minnesota Department of Transportation in 2000 to Minnesota Transit Constructors, a joint venture of Granite Construction Co., C.S. McCrossan, Inc., and Parson’s Transportation Group, Inc. The system will be operated by Metro Transit.

issues and slow response times. For future DBOM contracts, one representative preferred a different payment structure giving the agency more direct control over operations, i.e. paying on a time-and-materials basis rather than having a fixed base price. He also noted that there is less reason for a large, experienced transit agency with substantial in-house resources to use DBOM, but stated that he would recommend DBOM for new small agencies.

· For the JFK AirTrain, the representatives of the Port Authority of New York and New Jersey (Port Authority) stated that the basic reason for using DBOM was to obtain guarantees of the technology. The system provider would not guarantee what another entity operates, and a third-party operator would not provide availability guarantees for a system built by another entity. Particular advantages noted by these representatives were the ability to commence use of discrete systems prior to completion of the entire system, and the quality of employee training provided by the O&M contractor.

· The project owner representative for
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the Denver International Airport APM felt that DBOM worked well for this project. DBOM made the coordination of the APM within a major project (a new airport) reasonable. Advantages included less concern about warranties and no disputes between DB and O&M contractors about scope and responsibility. Software development was a major challenge, although it is not clear that this was due to DBOM. One significant service disruption apparently occurred due to lack of failure-management preparedness.

Additional insight into the contractor’s perspective was provided by an interview of a representative of the DBOM contractor team for the Tren Urbano Project in Puerto Rico. That contract imposes graduated penalties and/or graduated incentives to enforce system availability and reliability standards as well as preventive maintenance standards. According to the representative, this system gives the contractor motivation not only to achieve high standards in the O&M phase, but also to consider the quality of materials and construction practices during the DB phase.

LESSONS LEARNED
Most of the agency representatives with DBOM experience would consider using DBOM again, although they might modify the approach based on lessons learned in previous projects.

• The Port Authority representatives would “absolutely” use DBOM again, although they noted that the project owner should still have a strong in-house management team to oversee the O&M contractor.

• The representatives for the Denver International Airport APM and Atlanta International Airport APM stated that they would use DBOM again. The Atlanta project owner is currently in the process of buying a new APM system, and will most likely use DBOM again.

While the report was being prepared, the Las Vegas Monorail was undergoing commissioning tests which resulted in its opening was delayed. After operations commenced, the line was shut down on two occasions (the second for several months) due to technical problems affecting the vehicles.

The DBOM delivery method placed the project owner in a strong contractual position to obtain remedies and corrective action, and the DBOM contractor paid liquidated damages for delayed opening. It bore the risk and responsibility to analyze and correct the problems, without cost to the project owner. From the project owner’s perspective, it did not have to ascertain whether the problems were due to defective design or construction of the guideway, defective design or construction of the vehicles, defective integration, or defective maintenance.

The DBOM contractor was obligated to respond. During the shutdown of operations, the DBOM contractor’s compensation for operations and maintenance was reduced under availability and reliability payment reduction factors in the contract. This created significant incentives to analyze and rectify the problems as rapidly as possible.

SURVEY FINDINGS: DB PROJECTS
Project owners that used DB to develop transit projects were asked to explain the decision not to incorporate O&M services into the contract, and whether DBOM is a future choice. Four of the five transit/APM project owners did not use DBOM because their projects were extensions of existing systems and needed to be integrated with operation of the existing system.

Three of the other project owners indicated that they would be interested in using DBOM for an appropriate project. One of those three was currently evaluating DBOM for a separate commuter rail project unrelated to its existing LRT system, and another is considering DBOM for highway projects.

The fifth owner stated that, although his agency had no plans to use DBOM, he thought it might be appropriate for a passenger rail project to be developed by a start-up agency. He favored a contract for joint operation by the system supplier and owner for an initial five-year period. This would allow the owner personnel to become familiar with the system and be able to make an informed decision whether to extend the O&M contract or make other arrangements for future operations.

The reasons cited for not using DBOM fell into the following categories:

• Lack of Authority. Two of the four projects (the Gold Line and Hiawatha LRT) were constructed by agencies that did not have legal authority to use DBOM. In both cases the agency had been given authority to develop, but not operate, transit systems. Although theoretically a DBOM procurement could still have occurred in this type of situation through use of intergovernmental agreements, no attempt was made to do so. It is also possible that Section 13(c) issues (federal law giving transit employees the right to continuing employment) and/or collective bargaining agreements would affect an agency’s decision regarding use of DBOM.

• Interfaces with Existing System. Three of the four projects (the T-REX, Airport MAX and the Gold Line) were developed as part of existing systems, using the same technology as other parts of the system. In such a case, it is impractical to split operations into two parts. Section 13(c) issues and/or collective bargaining agreements would also have
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to be considered before a decision could be made to contract out.

- Experience and Size of Project Owner Operations Staff. All four of the operating agencies interviewed have extensive experience in transit operations. One of the agencies (Metro Transit in Minneapolis) did not have experience with light rail operations, but the other three agencies were fully staffed to incorporate the new extension into their operations. For the Hiawatha project, the operating agency issued a request for competitive proposals for operations services, awarding the work to the transit agency staff two years prior to scheduled completion.

**DBOM AND SOCIAL GOALS**

The Seattle Popular Monorail Authority was concerned whether contracting out might undermine its commitments to a number of societal goals. The report therefore also surveyed literature on the effects of contracting out operations and maintenance services, one of the more controversial issues facing rail transit agencies.

A recently published survey conducted by the Transportation Research Board shows that almost 60 percent of transit agencies do some contracting out of bus or rail services. With regard to existing services, the decision is typically related to a desire to reduce operating costs and to improve cost efficiency. Much of the literature reviewed and many of the interviews focused on the general advantages and disadvantages of contracting out for public services, as opposed to the appropriate contracting methods for the first phase of a complex, high technology project like the Green Line.

The premise underlying the arguments against contracting out is that the profit motives driving the private sector in many cases do not coincide with the public interest. Opponents maintain that, although it is possible to include provisions in contracts providing incentives for appropriate performance, such contracts can become complicated and require significant oversight in order to assure performance. They are further concerned that if the public needs change, it may be costly to implement a change in the service contract. The publications reviewed also lament the fact that public agencies that contract out to reduce operating costs achieve this result only because the private sector reduces the number of employees and/or reduces wages and benefits for the service workers.

The materials reviewed primarily focus on the question of cost-effectiveness of contracting out, with widely divergent results based on the same underlying data. As an example, depending on which study is examined, contracting out bus services for the Foothill Transit District in Los Angeles resulted in cost savings in the 50 percent range, or no cost savings, or savings somewhere between zero and 50 percent. The TRB study on contracting out concluded that the data currently available does not support any determination regarding the cost-effectiveness of contracting out in general.

The Authority’s initial decision to proceed with the DBOM contracting approach was not based solely on a desire to minimize costs. Instead, it was based on an analysis showing that a DBOM approach will further the Authority’s goals relating to excellence in design and O&M price certainty; other transit agencies using DB and DBOM strongly endorsed this reasoning. As a result, the Authority’s primary concern relating to O&M costs was to ascertain that the successful proposer’s price is consistent with the
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Authority’s budget estimate, not whether one approach is ultimately more cost-effective than the other. Such a comparison would, however, be useful to an agency in deciding whether to extend the operation and maintenance contract term.

Several commentators and materials noted that contracting out for transit services involves safety concerns, specifically mentioning the derailment resulting in a fatality during testing on the JFK AirTrain. Although the accident cannot be excused, it is an isolated incident. It would be difficult to draw the conclusion, based on a single incident, that as a general matter private operations are less safe than public operations. The TRB study regarding contracting out specifically discussed allegations that private contracting reduced the quality of service and caused safety problems and concluded that such allegations have not been proven.

The report did not attempt to resolve the underlying philosophical questions about the merits of contracting out. Rather, it considered the impact on several societal goals adopted by the Authority.

One issue of particular concern was the desire to ensure that O&M workers receive fair compensation for services provided. Information obtained from the union representative for the Hudson-Bergen project indicated that wages paid to operators are low when compared with wages paid for comparable services on other projects. This circumstance has resulted in much greater turnover in personnel than normal. The Hudson-Bergen representative indicated that compensation for maintenance personnel was higher than that of operators but that issues relating to maintenance personnel compensation have been raised to arbitration as well. For future DBOM projects, he suggested including a contract requirement for the operating company to pay rates comparable to those paid to workers at other systems. He also said he would like the operating company to have a labor relations liaison on management staff, and to be more responsive to worker concerns in general. The Authority incorporated into its DBOM documents provisions to promote living wages and good working conditions for operations and maintenance workers.

MAJOR CONCLUSIONS

Information obtained from interviews and review of materials provide corroborative evidence of the validity of using DBOM for passenger rail transit projects. DBOM is capable of delivering the following advantages:

• Contractual Integration. DBOM integrates all design, construction, operations and maintenance services into a single source of contractual responsibility. This eliminates most of the problems owners face with proving whether the cause of future problems is with the designer, the builder or the operator. “Finger-point-
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Artist rendering of the proposed elevated Yesler Station for the Seattle Monorail. Image courtesy of the Seattle Monorail Project.

ing” among multiple contractors, and the resulting difficulties of proving causation, are avoided.

- Reduced System Integration Risk. DBOM significantly reduces agency risks relating to system integration by requiring the designer, builder and supplier to work together to solve fixed facility and operating system integration problems. This benefit is particularly important for start-up agencies and agencies with limited staff resources deploying systems with new or complex technology.

- Quality Control and Life Cycle Cost Efficiency. DBOM acts as an effective “quality hook” in design and construction of projects, creating substantial incentive for the project designer to enhance project quality to reduce operations and maintenance expenses and to avoid system failures and resulting decreases in system availability and reliability.

- Increased Cost Certainty. DBOM provides early certainty regarding design, construction and operation and maintenance costs, reduces opportunities for cost growth and increases likelihood of achieving financial targets.

- Better Cost-Saving Innovations. DB/DBOM encourages use of innovative, cost-saving approaches that can be highly beneficial to the project. Best value, competitive procurement of DBOM contracts coupled with the fixed price method of...
compensation under DBOM motivates the contracting team to find innovations that will reduce costs both during the procurement phase (to win the procurement) and during contract performance (to increase profit).

- **Increased Schedule Certainty and Earlier Project Delivery.** DB can greatly accelerate the completion schedule and provide schedule certainty; DBOM enhances the schedule certainty advantages provided by DB.

- **Social Goals Achievable with DBOM.** Many agencies, like the Seattle Popular Monorail Authority, are committed to achieving social goals through their transit functions. For instance, the Authority was (and is) committed to diversity in hiring and business, living wages, good working conditions, environmental sustainability, and excellence of design responding to neighborhood character. The Authority was concerned whether contracting out might undermine these commitments. The Authority found that it could address its social goals and objectives in the context of DBOM by including appropriate provisions in the DBOM contracts, including covenants, warranties, restrictions and incentives. Achievement of such social goals becomes a matter of effectively overseeing and enforcing contract compliance.

- **DBOM Preserves Public Control of Fare Structures.** Nothing in DBOM for passenger rail projects requires transfer of control over the fare setting function to the private operator. DBOM generally does not require the private sector to assume financing or revenue risk. Accordingly, the private operator is relatively indifferent to fare structures as long as its fare collection system has the technical capability to implement fare rates set by the public agency.

In Seattle, the Authority continued with its DBOM procurement after its board considered the report and public comments, including comments from labor unions. The Authority built a number of provisions into the DBOM documents to promote social goals of importance to the Authority, including providing living wages to operations and maintenance personnel. In September 2004 the Authority selected Cascadia Monorail Company, a limited liability company owned by Fluor and Washington Group International, the sole proposer, to engage in negotiations for the DBOM contracts. In November 2004 the voters of Seattle soundly defeated a referendum to halt the monorail. The Authority and Cascadia are currently in active negotiations.

Given these advantages, DBOM should continue to receive serious attention as an alternative to more traditional methods of delivering and operating passenger rail transit projects.

Fredric Kessler has more than 25 years of experience in infrastructure development and transactions, telecommunication and real estate matters for institutional clients in the private sector and public agencies. His full professional profile may be found online at www.nossaman.com/people. To view the entire report from which this article was produced, visit the Information Center at www.nossaman.com, click on Presentations and scroll down to Infrastructure.