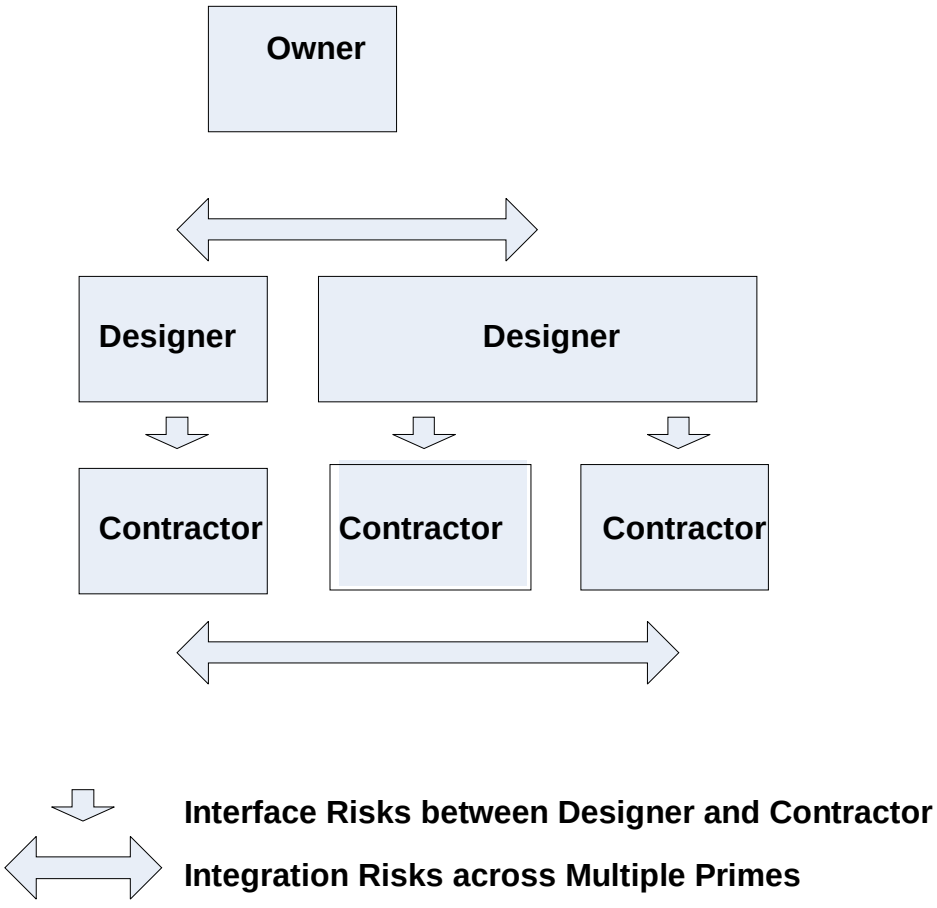
Comparison of Design Bid Build and Design Build Finance Operate Maintain Project Delivery

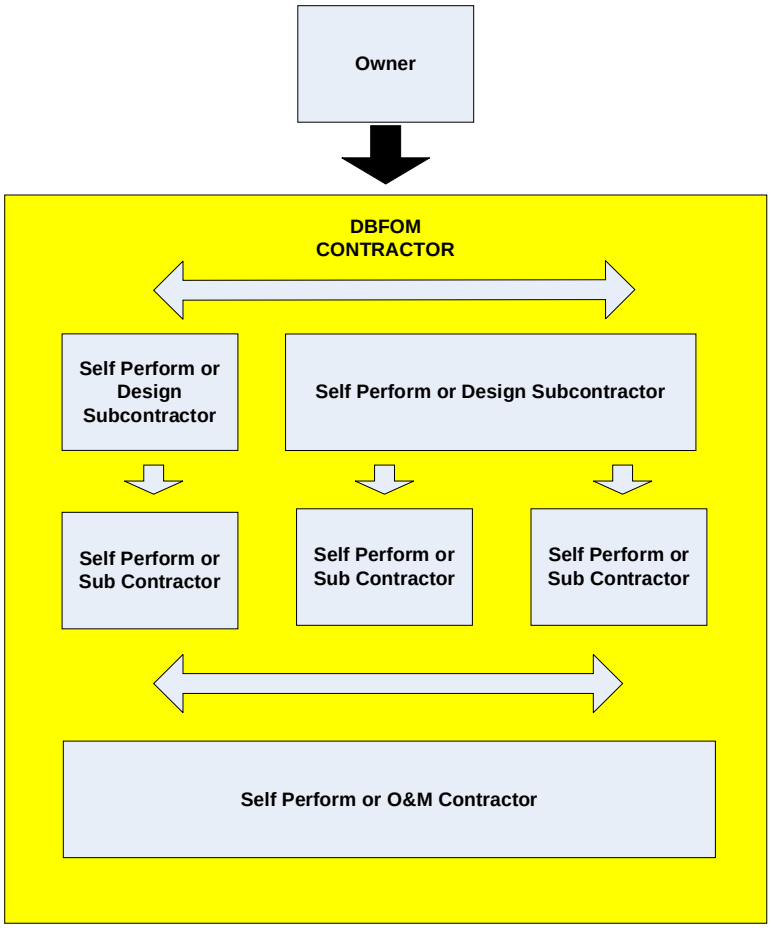
By Bob Prieto

Design Bid Build (DBB) and Design Build Finance Operate Maintain (DBFOM) project delivery differ in significant ways as shown in the table at the end of this article. In simplest terms, under DBB, the owner retains significant interface risk between the designer and builder and in multi-prime projects also retains integration risk across the primes as shown in the following figure.

Effectively this is the "white space" risk between each of the contracting parties and is often not adequately considered in project planning, budgeting and schedule development. Multiple parties create difficulties in effective partnering and project performance is adversely impacted if these risks emerge. In all instances the owner is warranting the completeness and accuracy of the design to the contractor thus directly holding this interface risk.



The use of a DBFOM project delivery approach significantly modifies the risk profile of the owner as the DBFOM contractor now assumes both this interface risk as well as the integration risk across all project elements. This can be seen clearly in the next figure. The Owner holds risks associated with his contract with the DBFOM contractor. These risks may include any shared risks or owner retained risks as they have negotiated.



Examples of How Risk Transfer Differs

Let's look at two examples to illustrate the differences between DBB and DBFOM risk transfer.

Design Error or Omission

In a complex highway project the designer makes an error in calculating the maximum span lengths and the supporting columns already constructed must be removed and new, more closely spaced columns constructed. The designer's E&O insurance is inadequate and the designer has limited assets that will not cover the contractor's increased costs. The owner holds the risk and therefore the compensation due to the contractor is from the owner. (The owner may obtain partial recovery from the Engineer or his E&O carrier)

Under a DBFOM approach this risk would have been transferred to the DBFOM contractor and the owner should have no obligations to the DBFOM contractor.

Scope Not Adequately Defined

In the execution of new, complex urban rail project under a DBB approach the owner has hired multiple engineers and contractors and is serving as the overall project manager. He has developed detailed scope documents for each engineer and subsequently approved the detailed scopes put out for construction bids on a low bid basis. His scope documents though did not include any provisions for heavy maintenance of the transit vehicles.

This necessary feature is identified late in the design and construction process and delays initial system startup. The owner holds all risks and will bear all costs.

Under a DBFOM approach the DBFOM contractor would be given a functional specification to safely design, build, finance, operate and maintain the desired system to an established performance standard. This standard could not be met without a heavy maintenance facility for the transit vehicles. The risk and any associated cost would be fully to the DBFOM contractor's account. Depending on his performance requirements he may choose to implement other solutions including a more limited, but functional temporary facility.

Unexpected Maintenance Issues beyond a Normal Warranty Period

On a major cable stayed bridge carrying an electrified rail line, accelerated corrosion of the cables was noticed seven years after project completion and well beyond the warranty period of the cables. Inspection of the cables shows no latent material defects and they were installed correctly per the design drawings by the bridge builder. A review of design drawings and specifications showed them to meet or exceed industry codes and standards as well as the owner's own required standards. Independent experts suspect that transient loading of the bridge may create temporary pathways for stray currents in ways that had not been previously understood.

Under a DBB approach the risk is retained fully by the owner as is the cost of repair or replacement of the cables. It is an unexpected operating cost and not a warranty or defective workmanship item.

If the owner had selected a DBFOM approach with a performance specification that limited force majeure events to acts of god, civil strife and sovereign actions, the risk and associated costs would be borne entirely by the DBFOM contractor and not by the owner.

These three examples illustrate how "white space" risks, especially those related to:

- Interfaces between designer and contractor
- Integration risks across all project elements

- Operating phase risks caused by no-fault design and construction inadequacy

are transferred from the owner to the DBFOM contractor.

The differences go well beyond risk transfer and are enumerated in the following table.

Comparison of Design Bid Build and Design Build Finance Operate Maintain Project Delivery

Parameter	DBB	DBFOM
Strategic Business Objectives	Politically driven; technically and funding constrained	Economically driven; technically and politically constrained
Top Level Key Performance Indicators (KPIs)	Cost and schedule	Return on Investment; cash flow; availability or other performance payment indicators
Strategy	Outputs focus	Outcomes Focus
Government Commitment	Incremental	Front end loaded
Procurement Process	Transparent procurement	Transparent procurement
	Competitive selection; limited innovation	Competitive selection; competition of ideas
	Low bid construction cost competition	Lifecycle & financing cost competition
Stakeholder Management	Owner responsibility	Significant DBFOM role
Project Selection	Step-wise decision framework	Life cycle decision framework
	State cannot advocate for a preferred option	Private sector may advocate for a preferred option
		Rigorous project selection and avoidance of political “white elephants”
Project Management	Multi-party partnering a challenge for owner	Owner partnering focus is with DBFOM contractor only
	Sequential design and construction Process	Parallel design and construction Process
	Procurement begins with construction.	Procurement may begin prior to construction (early design elements).
	Execution responsibility shared between designer and builder; owner holds significant responsibility for	DBFOM has execution responsibility

	interface risk	
Scope	Scope completeness a requirement for bidding construction	Functional performance specification completeness a requirement
	"Wants" enter into project "scope" at various stages without full life-cycle impacts being understood	Functional specification ensures "needs" are met and the cost of "wants" not incurred
	Design influence throughout design phase	Limited design influence beyond what specified in functional specification
Schedule	Design process may drive schedule	Schedule drives design process
	Limited schedule acceleration opportunity	Incentivized schedule performance
Budget	Best estimate of cost	Life-cycle cost certainty
Risk Focus	Initial delivery	Life Cycle
Risk Reserves	Quantitative risks	Quantitative and event risks
Risk Management	Exposure to multi-party disputes (derived from integration and interface risks)	Disputes limited to single contractor
Integration Risk	Integration risk (multiple primes)	Integration risk transferred to DBFOM contractor
Interface Risks	Interface Risk (Design to Constructor)	Interface risk transferred to DBFOM Contractor
E&O Risk	E&O risk starts with owner	Owner has no E&O exposure
Change Control	Continuous design influence	Limited design influence; "fit for function" test against performance specification
Decision Making Frameworks	Owner decision and review process (e.g. change approval) extensive and lack of timeliness adds cost and delays	Owner decisions and reviews (less changes) are more limited
	Time value of money not apparent	Time value of money a key driver
Value Improvement	Limited builder input in planning, design or work packaging (multi-prime)	Builder able to significantly influence planning, design and work packaging.
Safety	No common safety culture across contractors during construction	Common safety culture driven by DBFOM contractor
Sustainability	Objectives established; benefits accrue to owner	Minimum objectives established by owner; direct benefits accrue to DBFOM contractor
		Promotion of environmental and

		social sustainability as the DBFOM contractor focuses on efficient use of resources and materials over the project lifecycle.
Quality	Owner assumes responsibility for design quality	DBFOM contractor responsible for design quality
	Owner undertakes quality assurance of construction	DBFOM contractor largely responsible for quality
Lifecycle Focus	First cost emphasis	Life cycle cost analysis
	Long term maintenance and renewal funding may be uncertain	Contractual framework increases availability of long term maintenance and renewal funding
Warranty	System warranty limited by owner operation	Owner has general performance "warranty"
	Limited warranty	Effectively an extended warranty
Facility Performance	Owner responsible	DBFOM contractor responsible to Owner
		Improved level of service, especially for projects requiring user charges or achievement of performance levels for compensation
Facility Renewal	Subject to annual appropriations; statutory requirements only	Performance driven
Facility Turnover	None	Defined at time of DBFOM contract
Public Finance	Required	May or may not be required depending on DBFOM model
		Preservation of public capital capacity
Cash Flow	Often annual appropriation limited; creates inefficiencies	Project financing provides needed cash flow support for efficient execution
Skills Required	Current skill sets	New skill sets related to performance specifications and financial modeling

References:

1. Role of Project Delivery Systems in Infrastructure Improvement; Construction Research Congress 2003; Michael J. Garvin, Ph.D., P.E.*

2. A Guidebook for the Evaluation of Project Delivery Methods; TCRP REPORT 131

About the Author

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Bob Prieto is a senior vice president of Fluor, one of the largest, publicly traded engineering and construction companies in the world. He is responsible for strategy for the firm's Industrial & Infrastructure group which focuses on the development and delivery of large, complex projects worldwide. The group encompasses three major business lines including Infrastructure, with an emphasis on Public Private Partnerships; Mining; and Manufacturing and Life Sciences. Bob consults with owner's of large engineering & construction capital construction programs across all market sectors in the development of programmatic delivery strategies encompassing planning, engineering, procurement, construction and financing. He is author of "Strategic Program Management" and "The Giga Factor: Program Management in the Engineering and Construction Industry" published by the Construction Management Association of America (CMAA) and "Topics in Strategic Program Management" as well as over 400 other papers and presentations.

Bob is a member of the ASCE Industry Leaders Council, National Academy of Construction and a Fellow of the Construction Management Association of America. Bob served until 2006 as one of three U.S. presidential appointees to the Asia Pacific Economic Cooperation (APEC) Business Advisory Council (ABAC), working with U.S. and Asia-Pacific business leaders to shape the framework for trade and economic growth and had previously served as both as Chairman of the Engineering and Construction Governors of the World Economic Forum and co-chair of the infrastructure task force formed after September 11th by the New York City Chamber of Commerce.

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