

DESIGN BUILD

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Presentation Outline



- Design-Build Overview
- Forms of Design-Build Delivery
- Design-Build Advantages & Misconceptions
- Summary
- Questions

Design Build Definition



Design-Build is a method of project delivery in which one entity (design-builder or design build team) forges a single contract with the owner to provide for architectural and engineering design services and construction services.

Delivery Method Comparison:



Design-Build

- Professional Design
 - ✓ Multiple designs
- Competitive Bid Process
 - ✓ Best Value
 - ✓ Increased Innovation
- Project Execution
 - ✓ No Change Orders
 - ✓ Design Builder Responsible

Design-Bid-Build

- Professional Design
 - ✓ One design
- Competitive Bid Process
 - ✓ Lowest Bids
- Project Execution
 - ✓ Change Orders
 - ✓ Owner Responsible

Design Build Utilization



- **Types of Projects**

- ✓ Many States for DOT projects
- ✓ Municipalities for Water/Waste Water Projects
- ✓ Muni's, K12 and Commercial for New construction
- ✓ Renovations
- ✓ Any capital work

- **Typical Services**

- ✓ Engineering & architectural design
- ✓ Project management
- ✓ Commissioning
- ✓ Warranty & optimization
- ✓ Guaranteed performance
- ✓ On-going performance monitoring

Design Build

Historical Application



- **Noteworthy Past Design-Build Projects**
 - ✓ Pyramids
 - ✓ Parthenon
 - ✓ Great Wall of China
 - ✓ Rome

- **Noteworthy Current Design-Build Projects**
 - ✓ Pentagon
 - ✓ Nearly all new U.S. Army buildings
 - ✓ Nearly all Eli Lilly buildings
 - ✓ Gordie Howe International Bridge
 - ✓ Maryland, Florida DOT projects
 - ✓ 50% of all non-residential construction

Water Utilities and DBIA



Some water utilities have not considered design-build simply because they have never heard of it.

To combat this, the DBIA teamed up with the American Water Works Association (AWWA) and the Water Environmental Federation (WEF) to spread the word about design-build. The DBIA has released numerous online guides to design-build including Design-Build Done Right.

Penn State Study Comparison



COMPARISON OF PROJECT DELIVERY METHODS

METRIC	DESIGN-BUILD VS. DESIGN-BID-BUILD	DESIGN-BUILD vs. CM@R
UNIT COST	6.1% lower	4.5% lower
CONSTRUCTION SPEED	12% faster	7% faster
DELIVERY SPEED	33.5% faster	23.5% faster
COST GROWTH	5.2% less	12.6% less
SCHEDULE GROWTH	11.4% less	2.2% less

Source: Construction Industry Institute (CII)/Penn State research comprising 351 projects ranging from 5,000 to 2.5 million square feet. The study includes varied project types and sectors.



FHWA Studies



Horizontal Infrastructure - Highways	# of Projects or Agencies	% Reduction in Cost to DBB	% Reduction in Contract Duration vs DBB
Illinois DOT Study by SAIC, 2002	11 states	3 of 11 states reported lower cost	10 of 11 states reported shorter duration
New York State DOT Design-Build Practice Report, 2002	9 agencies	5 of 9 agencies reported lower cost	9 of 9 agencies reported shorter duration
Arizona DOT Study: Design-Build vs. Design-Bid-Build - Comparing Cost and Schedule. Jim Ernzen, Ron Williams, and Debra Brisk, TRB Paper 2004.	13	4%	22%
Ralph Ellis, Zahar Herbsman, & Ashish Kumar, Evaluation of the Florida Department of Transportation's Pilot Design/Build Program	11	11%	36%
Washington State DOT Study. Design-Build Pilot Project Evaluation: A Measurement of Performance for the Process, Cost, Time, and Quality	1	23%	16%
Jim Ernzen and Tom Feeney, Contractor Led Quality Control and Quality Assurance Plus Design - Build: Who is Watching the Quality?	1	N/A	30%
Bulk of Ambitious \$1.6 Billion Design-Build Job (Utah I-15 Design-Build Project)	1	0%	9%
ODOT Experience on Six Design-Build Projects, Ohio Department of Transportation	6	Lower administrative costs; little/no change orders or claims	Significant time savin

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Forms of Design Build project delivery

DB with Warranty



1) Design-Build with a Warranty (5, 10, 20 years) – integrated design and construction process whose product is guaranteed to specified and workmanship or performance standards over a prescribed timeframe.

- This usually applies to highway pavement. The inclusion of a warranty shifts more project risk to the design-build team and reduces the extent to which the contracting agency needs to conduct inspection and testing.**

Forms of Design Build project delivery

DBOM



2) Design-Build-Operate-Maintain (DBOM) – the contract team is responsible for design, construction, operation, and maintenance of the facility for a specified period of time, whereby payment beyond project completion is predicated on meeting certain prescribed performance standards relating to physical condition, capacity, congestion, and/or ride quality.

- **This is an extension of design-build that provides an inherent incentive for the design-builder to provide a better quality plan and project by creating a lifecycle responsibility and accountability for the performance of the facility by the design-builder.**
- **Example The Gordie Howe International Bridge.**

Forms of Design Build project delivery

DBFO/BOT



3) Design-Build-Finance-Operate (DBFO) - this is an extension of the DBOM project delivery method in which the contract team is also responsible for the financing of the project and takes the risks of financing the project during the contract term. (Common P3 model)

4) Build-Operate-Transfer (BOT) - this is a project delivery method similar to DBFO whereby the contract team acquires ownership of the facility until the end of the contract term at which time ownership of the facility is returned to the original public sector contracting agency. (PPA's and P3's)

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Advantages:

Design Build Procurement

■ **Best Value Selection**

- ✓ Price + Quality = Best Value
- ✓ Early Contractor involvement enables construction engineering to be incorporated

■ **Owner Chooses**

- ✓ Design builder
- ✓ Contractors
- ✓ Designs
- ✓ Materials



Advantages:

Design Build Procurement

■ **Lower Construction Costs**

- ✓ No “change orders”
- ✓ Lower “soft costs”
- ✓ Designers and contractors collaborating during design process
- ✓ Fewer layers of mark-up
- ✓ Shortened timeline

■ **Less Aggravation – No Finger Pointing**

- ✓ Sole source responsibility
- ✓ No “change orders”
- ✓ Guaranteed learning environments
- ✓ Guaranteed energy savings
- ✓ Win-win partnership



Misconceptions:



▪ **Fox Watching Hen House**

- ✓ **Trust** in chosen design builder is essential
- ✓ **Win-win structure** align goals, self interest assures goals are achieved
- ✓ **Several cooks** in kitchen gives false sense of security. When food tastes bad, everyone points fingers. Trusting one cook works better.
- ✓ **Guaranteed performance** and **no change orders** forces design builder to deliver

Misconceptions:



■ **Costs More**

- ✓ National studies show design-build **costs 4-6% less**

■ **Cut Corners – Lower Quality**

- ✓ National studies show design-build **quality is 10% higher**
- ✓ Picking contractors & supplies improves quality
- ✓ Design builder must fix shortcomings for 10 or more years
- ✓ Rework is very costly to design builder
- ✓ Quality must be high to meet guarantees

Misconceptions:



▪ **Owners Get Little Say**

- ✓ Design builder must listen and respond to win
- ✓ Owner gets more input
 - Specify building performance in addition to design
 - Choose preferred contractors
 - Select from three designs versus only one
 - Make significant changes after selecting design builder

Misconceptions:



- **It's New and Risky**

- ✓ **Design-build** ruled for 4,900 of the last 5,000 years
- ✓ **50%** on all non-residential construction is design-build
- ✓ In truth, a traditional plan & spec project carries far **greater risk** of poor performance and change orders

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Summary



- **The design-build selection process takes a little more work and thought on the front end and may add some initial cost to the project, but it allows owners to take advantage of broader input with regard to the most cost-effective ways to accomplish their goals, gives owners better tools to ensure that appropriately qualified firms are selected and can pay dividends if problems arise later. Design Build can deliver faster, higher quality construction with cost certainty.**

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Thank You



Sources:

<https://www.dbia.org/about/Pages/What-is-Design-Build.aspx>

<https://www.fhwa.dot.gov/reports/designbuild/designbuild2.htm>