

**Design & Build
Challenging the Mindset of the
Employer's Engineer**

**Presentation by Adel khreich
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Objectives

To explore the following aspects of Design and Build (D&B) Projects

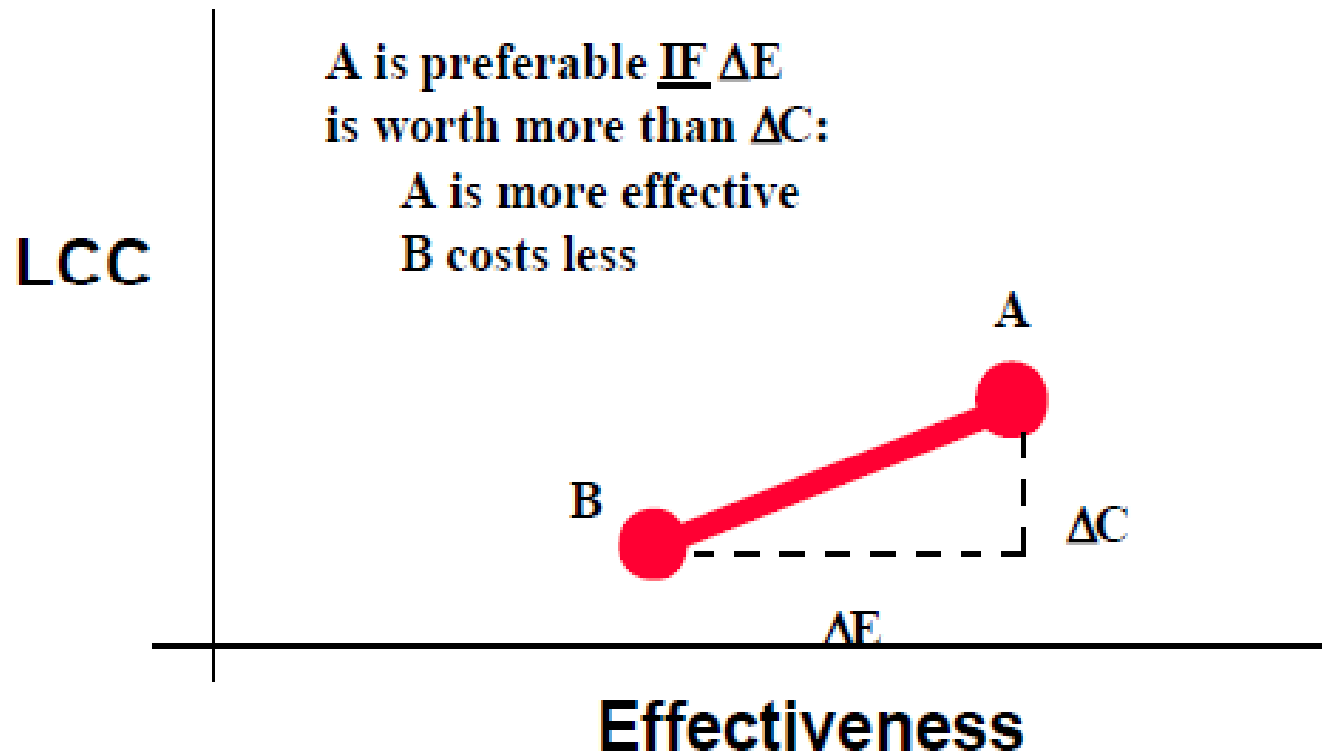
- Special Considerations when undertaking a project using D&B.
- The challenges for the Employer's Engineer.
- The different types of contract and delivery systems.
- The mindset required in administering a D&B Contract?



Special Considerations

How do you compare options in bids?

- Fit for purpose Vs. Lifecycle implications



Special Considerations

Value for Money vs. Aesthetics

- How does a performance specification portray Employer's need for a WOW factor?



- If a unique /innovative design is required, then most likely D&B is not suitable?
- If a specific element of the overall project requires to have a WOW factor – suggest the design for the specific element is progressed to an adequate level prior to bids.

Special Considerations

Sustainability vs. \$ the Contract Price

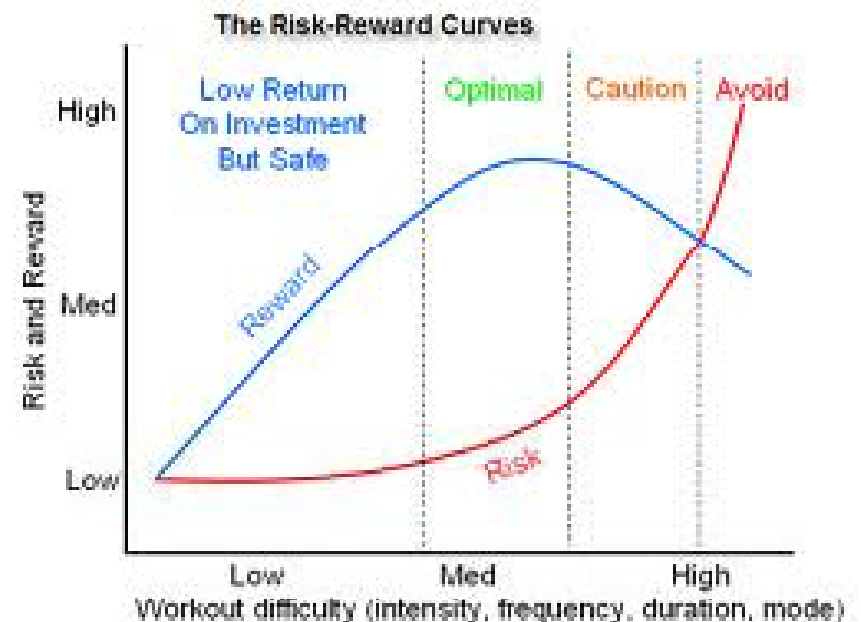
- How do you rate sustainability in bids?
- Is it just lip service?
- Can the benefit be measured?
- The biggest challenge will be explaining to the Employer why he has to pay more for a project.



Special Considerations

Risk transfer vs. \$ the Contract price

- Is there a point where risk transfer is just not economical?
- Can a bidders realistically take the risk on thing such as unknown ground conditions? If so at what price?
- Do Employers understand the premium they are paying to transfer certain risks?



Why undertake a project using D&B?

Why do Employers feel they want to go for D&B?

- It is one of the oldest forms of contracting where both designs and construction are the responsibility of one person.
- However in modern procurement environments, it may not suit every project.
- Each project should be evaluated on its merits using a proper evaluation process.



Why undertake a project using D&B?

The Employer is probably thinking...

- Design standards exist - why have his team do the design?
- No resources to manage design issues during construction.
- Time constraints - overlap design and construction.
- Pass on the design risks to the Contractor.
- Wants more certainty about project cost earlier.
- Wants cost saving from Contractor's innovations.
- Access to proprietary solutions that cannot be specified

Why undertake a project using D&B?

Research shows the impact of using D&B

Duration Dimension	Value	Cost Dimension	Value	Quality Dimension	Value
Responses	62	Responses	48	Responses	61
Average	-14.1%	Average	-2.6%	Average	0.0%
Median	-10.0%	Median	0.0%	Median	0.0%
Mode	-0.1%	Mode	0.0%	Mode	.0%
Maximum	50.0%	Maximum	65.0%	Maximum	10.0%
Minimum	-63.0%	Minimum	-61.8%	Minimum	-10.0%
Standard Deviation	24.4%	Standard Deviation	20.5%	Standard Deviation	2.1%

Research Undertaken by The Florida Department of Transport

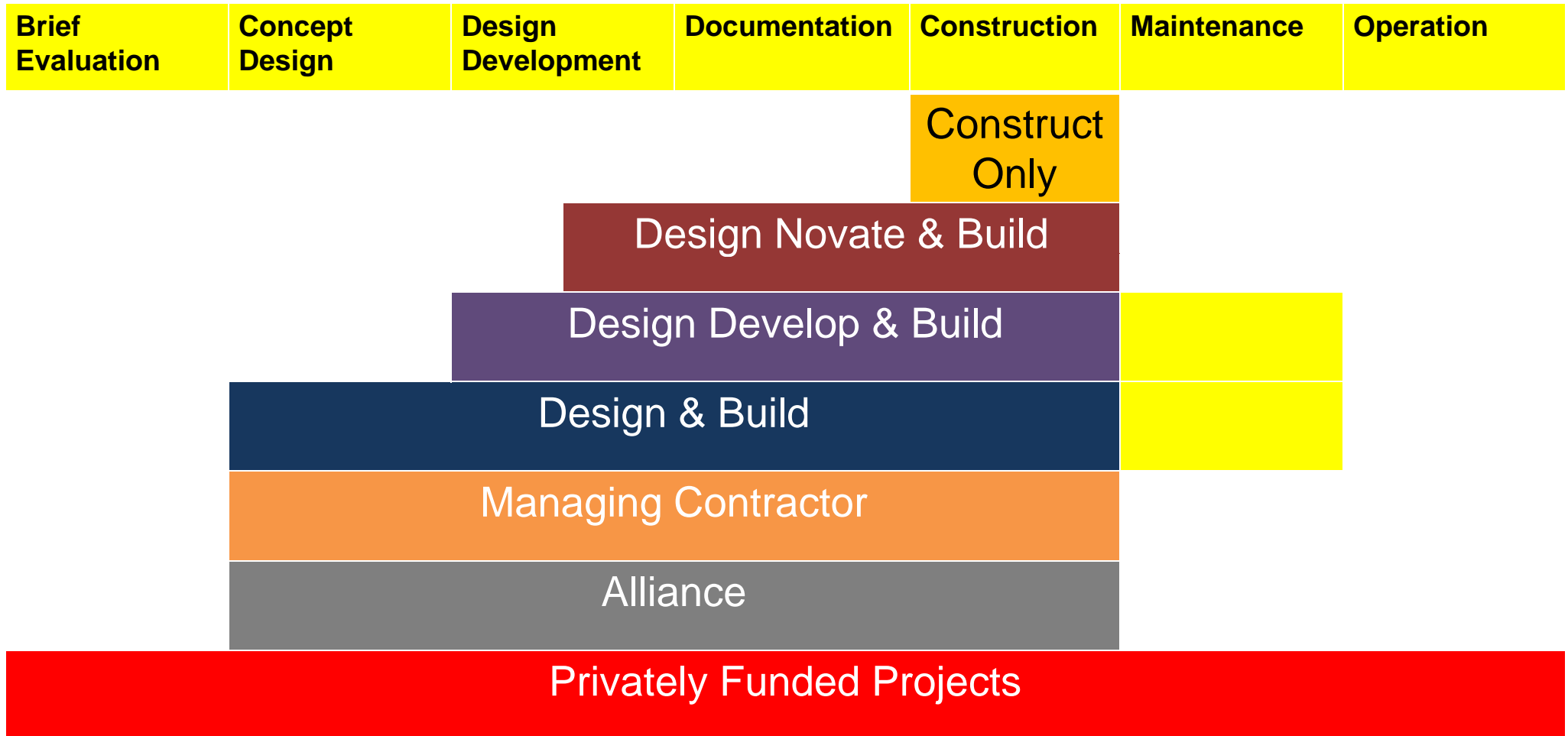
Contract and Delivery Systems

Does the Employer understand there are other forms of early contractor involvement (ECI)?

Delivery systems	Single Contract	Multiple Contract / Packages	Managing Contractor	Alliance	Privately Funded
Contract Systems					
Construct Only (fully documented)	X	X			
Design, Novate and Build	X		X		
Design Development and Build	X		X		
Design and Build	X		X		
Managing Contractor	X		X		
Alliance	X			X	
Privately Funded	X				X

Contract and Delivery Systems

Early Contractor Involvement (ECI)



Why Have so many different systems

Why have so many systems?

- Risk allocation
- Flexibility for the Employer (to continue to define his requirements)
- Timing of design and construction
- Innovation
- Finance considerations

Using D&B Contract System

- The Employer's Engineer develops a performance and quality requirement specification (and can sometimes do part of a concept design).
- Easy if it is...
 - a) 50,000 sqm of commercial space
 - b) To authorities development guidelines (will have a known building height, setbacks, massing and overall envelope)
 - c) 5 star green rated
 - d) Facilities equal to building X down the road



When not to use D&B

- Not so straight forward if
 - a) World class laboratories to be used for research into the latest disease threatening humanity (other than the GFC) or
 - b) An opera house that will be regarded as an international Icon.....
- You just would not do a Design and Build, because you want to retain control of every detail of the design.



Performance Specification

What are the key technical elements in specifying a bridge under D&B?

- Alignment,
- Typical section elements,
- Design criteria,
- Design guidelines,
- Aesthetic requirements (architectural – **may need a concept drawing**),
- Standard detail drawings,
- Subsurface soil data,
- Vertical and horizontal clearance requirements,
- Load rating,
- Hydraulics,
- Vehicle (ship) impact data,
- Roadway approach needs, and
- Maintenance.

Challenges for the Engineer

Requirements must be clear and precise, or...

- Variation costs of magnitudes larger than fully documented construct only contracts; or
- Product of a lesser standard; or
- Requirements not fully met.

Achieve a balance between

- Transfer of risks and the tender price – analyse in detail.
 - a) The Employer does not want to hold the risk of ground conditions. Does no investigation means no risk?
 - b) The Contractor will increase his price to offset the risks – but the Employer wants to get a price advantage from D&B.

Challenges for the Engineer

Achieve a balance between

- Time to go to tender and locking down the requirements
 - a) The Employer wants this out to tender now;
 - b) The Employer (mistakenly) thinks that because it is D&B that the Contractor bears all risks and “*there will be no variations*”

Maintaining a viable market willing to tender for the project with no (or few) qualifications.

- Bidders will try to qualify some risks out of their tenders; and
- Upwards pressure on price due to many contractors finding that they are unwilling to take on all these risks.

Challenges for the Engineer

Clear the path for the contractor

- Approvals that are essential to start,
- Process that facilitates design review and approval. Very different from the process used in a fully documented approach,
- Employer's Engineer cannot sign off on designs by others.

Challenges for the Engineer

More facilitator than designer and must...

- Extract input from the Employer earlier and in more clarity without the benefits of future fine tuning,
- Manage the user expectations from early days
- Educate the Employer in the realities of D&B. Regular workshops.
- Undertake a detailed risk assessment with the Employer and quantify the effects of the risks
- Agree the risks that should be passed onto the Contractor and those that should not be,
- Agree the elements that can be specified based on performance and those that should be further designed

Challenges for the Engineer

During Contract Administration...

- Quality control and verification is with Contractor and monitoring should be through independently accredited agencies appointed by the Contractor.
- The Contractor is only bound by the original design brief and is entitled to continue innovating.
- Keep an open mind as the Contractor steers the design.

Challenges for the Employer

Employer to...

- Get early advice if the project is suitable for D&B or not.
- Develop a comprehensive requirements brief.
- Appoint representatives that understand the D&B process and have a culture for quality.
- Attempt to clear the path for the future contractor for all things that can be undertaken ahead of the contract, such as land zoning, community consultation, etc...

Challenges for the Contractor

Contractor to...

- Have good design management skills,
- Appoint consultants who have D&B experience and skills in constructability. Design experience alone is not enough as the process of designing under a D&B is quite different from a build only.
- Implement a system of strong communication between all parties and change control to avoid rework and disputes

Thank you

Thank you