An Engineer’s Perspective: Design-Build and Public Private Partnerships (P3)

Presented by
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- Leads Burns’ Railroad and Transit Group
  - Design and construction services
- BSEE Drexel University, 1990
- 29 years of experience in the design, estimating and construction management of railroad and transit systems and facilities
- 8 years as Electrical Contractor
- Registered Professional Engineer: PA, NJ, MD, CO, FL, WA, VA, CA, IN
This presentation will provide a look at the role the engineering community plays in design-bid-build, design-build and P3 procurements. The presentation will also touch on the traditional engineering business model and how it is evolving to help support the development of alternative procurement methods.

<table>
<thead>
<tr>
<th>Alternative P3 Approaches</th>
<th>Finance</th>
<th>Design</th>
<th>Construction</th>
<th>Maintenance</th>
<th>Operations</th>
<th>Traffic-Revenue</th>
</tr>
</thead>
<tbody>
<tr>
<td>Traditional Design-Bid-Build Procurement</td>
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<td>✔️*</td>
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<tr>
<td>Design-Build</td>
<td>✔️</td>
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<tr>
<td>Design-Build-Operate-Maintain (DBOM)</td>
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<td>Design-Build-Finance-Operate-Maintain (DBFOM, or DBFO)</td>
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* Limited risk transfer
** Revenue risk retained by public sector in availability payment concession
Traditional Design-Bid-Build

- Brooks Act (1972)
- Qualifications based selection
- Independent design and construction contracts
- Risk for time and costs mostly born by sponsor
- Highly regulated fee structure to engineering firms (cost plus fixed fee, capped at 10%)
- Not-to-exceed terms creeping into engineering contracts

“It's a very sobering feeling to be up in space and realize that one's safety factor was determined by the lowest bidder on a government contract.”

*Alan Shepard (1966)*
Traditional Design-Bid-Build

- Engineer and Contractor(s) have no contractual relationship
- Adversarial relationships are commonplace
- Limited ability to use innovation
- Competing priorities with stakeholders (Owner, affected agencies, public, operations and maintenance, engineer, contractor(s))
- Additional complications with PA Separations Act
Design-Build

- Established to reduce project timeframe and transfer design risk to contractors
- Traditionally two staged selection process
- Qualification/Price combination for best value
- Transfers some design responsibility to pre-bid phase
Design-Build

- Early collaboration on design/build solutions
- Contractual relationship between engineer and Design-Build contractor
- Built-in value engineering incentive
- Pricing model for engineering still maturing (relationships are key drivers for pricing)

Comparison of Project Delivery Methods

<table>
<thead>
<tr>
<th>Metric</th>
<th>Design-Build VS. Design-Bid-Build</th>
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<tbody>
<tr>
<td>Unit Cost</td>
<td>6.1% less</td>
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<tr>
<td>Construction Speed</td>
<td>12% faster</td>
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<tr>
<td>Delivery Speed</td>
<td>33.5% faster</td>
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<tr>
<td>Change Orders</td>
<td>5.2% less</td>
</tr>
</tbody>
</table>

Source: Construction Industry Institute of Texas (CII) study comprising 351 projects ranging from 5,000 to 2.5 million square feet. Study includes varied project types and sectors.
Design-Build

Designer Priorities

• Teaming agreement understanding engineering cost model
• Responsibility assigned to proper entity (Engineer/Contractor/Manufacturer)
• Collaboration on design decisions (workshops with field supervision)
• Recognition of hidden costs (undefined construction support)
Design-Build

Designer Priorities

• Timely design decisions
• Inclusion on any change with owner
• Risk register with acknowledgement of priorities
• Defined incentives for value engineered services
Public Private Partnerships (P3)

- Used to finance, build and operate, and maintain projects
- Concessionaire team of financier, contractors, engineers and operators
- Used for projects where current financial limitations exist on year of expenditure funding
- Harnesses private sector innovation
- Complex concessionaire payment system (availability, quality, safety, etc.)
Public Private Partnerships (P3)

- Two or three stage procurement similar to design-build
- Best value heavily weighted towards financier
- Removes most risk from owner except revenue guarantees
Public Private Partnerships (P3)

**Designer Priorities**

- Very similar to design-build contract
- Added responsibility if engineering included in O&M
Conclusions

• Evolving construction market
• Risk distribution & financing are key to procurement choice
• Alternative procurement methods are opportunities for work responsibility improvements
• Understanding stakeholder goals at the start are keys to success
• Don’t forget to celebrate the successes
Questions?