Session 9
Design/Build Projects

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- Participants:
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  - Amber Phillips, Georgia DOT
  - Mariano Berrios, Florida DOT
  - Noel Alcala, Ohio DOT
  - Discussant: Greg Smith, North Carolina DOT
Design Build and CM/GC

An Alternative Project Delivery Method
What is the project need?

- **Design Build** - A project delivery system where design and construction activities are taken on by one entity.

- **CM/GC** - Owners coordinate and manage the entire project with both the design and construction entities working together early on.
The Master Building Philosophy

3 Jobs – Owner, Designer and Builder

1 Goal – Complete the project
Master Building Resurgence

- Trending back towards having the design team and the builder/contractor team work in unison for an owner

- Incorporate a builder’s skills, techniques, equipment, resources and availability into the development of the design
The Designer

I guess I would build it this way!?!?

- Creativity
- Design Standards
- Assumptions
The Builder

Why did they design it this way ????

• Resources
• Materials
• Innovation
The Owner

- Change orders
- Arguments
- Finger pointing
- Delays
- Increased costs
Bring all groups together for one goal – a Successful Project

Design - Bid - Build
Bring all groups together for one goal – a Successful Project

Owner

Design - Build

Design Build Team
Bring all groups together for one goal – a Successful Project

- Owner
- Design
- Contractor

Construction Manager / General Contractors (CM/GC)
Design Build
Prescriptive – Tell contractor how to do it (means and methods)

Performance – Tell the Design - Build Team what you want as a final product
Benefits of Design Build

- Single point of Responsibility
- Ability to Lower Overall costs
- Fast track the project delivery
Industry Direction for Design Build

- Manufacturing
- Offices
- Hotels/Motels
- Shopping Center
- Municipal
- Higher Education
- Water/Wastewater
- Healthcare
- Transportation

- Growing
- Maintaining
- Shrinking
Construction Manager / General Contractor (CM/GC)
The contractor acts as a consultant during the design process and can offer constructability and pricing feedback on design options and can identify risks based on the contractor's established means and methods. As noted, this process also allows the owner to be an active participant during the design process and make informed decisions on design options based on the contractor's expertise.

http://www.fhwa.dot.gov/construction/contracts/acm/cmgc.cfm#proc
Why States are considering/using CM/GC

- Inherent project risk
- Opportunities for innovation
- Need for specialized qualifications
- Benefits from early procurement
- Limited or fixed budget
- Every day counts initiative (EDC)
Shortening Project Delivery

Design-Bid-Build

CM/GC

Design-Build
2 Phase Process

- **Phase 1**

1. Owner selects
   a. Design Firm
   b. Independent Cost Estimator (ICE)
   c. The Owner selects a CM/GC
2 Phase Process

Phase 2

Owner asks CM/GC to submit final Construction Cost:

- Two estimates:
  - Designer-furnished Engineers Estimate
  - Independent Cost Estimate (ICE)

- Two Possible Outcomes:
  - Owner gets fair price – Proceed with build
  - Owner doesn’t get fair price – potential to then Bid the project out to all contractors.
How it Benefits Owners

- Opportunities for innovation
- Owners can own the design
- Improved cost control
- Improved design quality
- Value Engineering on the front side
- Schedule optimization
- Collaboration
## Comparison of Delivery Methods

### General Suitability of Delivery Models

<table>
<thead>
<tr>
<th>Project Traits</th>
<th>D-B-B</th>
<th>CM/GC</th>
<th>D-B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Management</td>
<td>Very limited</td>
<td>Very effective</td>
<td>Best for risk shifting</td>
</tr>
<tr>
<td>Collaboration w/ Designer &amp; Contractor</td>
<td>Very limited</td>
<td>Very collaborative</td>
<td>Moderate collaboration, contractual limitations</td>
</tr>
<tr>
<td>Price Certainty</td>
<td>None, subject to overruns and change orders</td>
<td>Very effective, early price certainty during project development</td>
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</tr>
<tr>
<td>Schedule Acceleration/Compression</td>
<td>No ability to overlap design &amp; construction, can accelerate construction with A+B</td>
<td>Ability to overlap design &amp; construction, ability to optimize schedule not just accelerate</td>
<td>Ability to overlap design &amp; construction, very effective for accelerating project delivery</td>
</tr>
<tr>
<td>Construction Quality</td>
<td>Low bid can compromise quality</td>
<td>Very beneficial to building a quality project</td>
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Comparison of Delivery Methods

**GENERAL SUITABILITY OF DELIVERY MODELS**

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<td>Innovation</td>
<td>Design Innovation only, very limited opportunities for contractor innovation</td>
<td>Very effective for capturing design and construction innovation</td>
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</tr>
<tr>
<td>Constructability</td>
<td>Very difficult to obtain construction input during design</td>
<td>Optimal delivery method for obtaining construction input before design is complete</td>
<td>Effective delivery method for obtaining construction input before design is complete</td>
</tr>
<tr>
<td>Owner Control</td>
<td>High level control</td>
<td>Optimal level of owner control</td>
<td>Somewhat limited owner control, more performance based outcome</td>
</tr>
<tr>
<td>Competitive Pricing</td>
<td>High level</td>
<td>Somewhat limited, competitive markup not final project cost</td>
<td>Good Competition, but usually limited to short-listed teams</td>
</tr>
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</table>
Each project needs to consider which delivery method is right for that project.
Different owners view different criteria as more important

- Initial cost
- Time
- Impacts
- Community
- Change orders
- Risk
Challenges in Design Build and CM/GC

- Lacks Standard Competitive Low Bids
- Selections Criteria is subjective
- Public Scrutiny of Selected firms/Teams
Working Together can improve safety and avoid major problems!
Noise Studies and Analysis in a non traditional project delivery method
Typical Options

1) The State transportation agency secures permits and the Design-Build Contractor is responsible for modifying and/or complying with permits.

2) The State transportation agency secures some early action high risk permits and the Design-Build Contractor is responsible for modifying and complying with those permits as appropriate, as well as for obtaining the remaining permits.

3) The Design-Build Contractor is responsible for obtaining and complying.
Balance the Risk – Topics for Discussion

- Local Environmental Agency acceptance

- Typically states lean toward obtaining permits and NEPA documents

- Right of way impacts could be affected depending on the size and magnitude of mitigation.

- Design Build teams will try to engineer out the feasible or reasonableness requirements thus saving lots of $$

- Commitments to communities may be challenged
Thank You

http://www.fhwa.dot.gov/construction/cqit/cm.cfm
Design Build & Noise

A Delicate Balance

Amber Phillips GA DOT
Types Of Design Build Projects

• Design Build
  – A contract that is let and awarded to a Design-Build Team who designs and constructs the project.

• Design Build Finance (Public Private Partnership (P3))
  – A contract that is let and awarded to a Developer/Private Concessionaire who designs, finances and constructs the project.
Approach

• Study Noise Impacts in NEPA with a reasonable assumed design. Identify Likely walls
• Reevaluate for revised design/location
• Conduct Public Outreach
• In Practice it is not always this straight forward!
Challenges

• Noise Policy
  – Differing Interpretations
  – Fitting D/B Projects into the mold for Traditional Design Bid Build Projects

• Public Involvement
  – Timing of Outreach vs Timing of Construction Areas

• Future Projects
  – Potential Conflicts with Wall Placement, Public Outreach, and Commitments
Solutions

• Policy Clarification
  – Update Policy to close interpretation loop holes, make sure all policies, design, procedures, etc. do not conflict.
  – Contract wording

• Close Teamwork
  – Good communication
  – Joint Team Meetings
  – Work closely with FHWA
Conclusion

• In Georgia more Complex Projects are moving to Design Build
• We are Updating our Noise Policies to cover Design Build rather than only covering Design Bid Build.
• Learning from each unique situation strengthens the Process
Design-Build (DB)/Public-Private Partnerships (PPP) Projects

• General Objectives
  • Compress Design and Construction Schedules!
    • Bonuses for Early Completion
    • Penalties for Late Completion
  • Promotes Innovations!
  • Reduces Costs of Providing Infrastructure Improvements!
  • FDOT’s Cost Savings Initiative (CSI) Program
    • Contractor receives 50% of the net reduction in cost savings
Noise Abatement Considerations for DB/PPP Projects

• Make sure RFPs accurately identifies the noise barrier requirements!

• Tendency for DB Firms to evaluate designs that eliminate or modify recommended noise barriers to reduce their bids

• FDOT is responsible for any additional noise/barrier analysis required during the DB Process!

D/B teams cannot perform environmental re-evaluations!
DB/PPP Projects

• Biggest Challenges
  • Accurately defining RFP noise requirements
  • Inevitable design changes during DB/PPP process require iterative noise analyses to end up with an effective noise barrier design

• Major Reconstruction Projects have a higher potential for design changes affecting the effectiveness of noise barriers
  • Mainline and Ramp Profiles
  • Ramp Alignments and Gores
  • MSE Wall Locations
  • Cross Slopes
Noise Barriers and DB/PPP Projects

• Project noise analyst should be involved from the procurement phase through the design phase!
  • Involved in the DB RFP Development
  • Involved in the Evaluation of Alternative Technical Concepts (ATCs) if changes to Noise Barriers are proposed
    • Approval Process for Proposed Deviations from the RFP
  • Roadway and Structures Plans Reviews
• Noise barrier RFP requirements related to location are based on PD&E statement of likelihood and subsequent design level commitments
Request for Proposal (RFP) Development

- DB Standard RFP – Modified by Pre-Scoping Questions
  - http://www.dot.state.fl.us/construction/DesignBuild/DBDocuments/DBDocsMain.shtm
- Guidance Materials for Conducting Noise Studies and Designing Noise Barriers
  - Plans Preparation Manual, Vol. 1, Chapter 32 (Topic No. 625-000-007)
  - Design Standard Indexes & Instruction to Designers 5200 – 5215
  - PD&E Manual Part 2, Chapter 17 Noise
RFP Development

• Don’t assume when it comes to developing noise requirements for DB RFPs

  • Confirm that the Noise Study Report(s) to be attached to the RFP addresses all of the noise barrier requirements for the project including Aesthetics requirements!

  • Are the barrier heights and limits reasonable and consistent along the project corridor?

  • Were the heights and locations of the recommended noise barriers based on design level noise modeling including design survey data?

  • Have all public involvement activities including those related to outdoor advertising sign conflicts related to noise barriers been completed?

  • Has a preliminary constructability review been completed including potential drainage and utility conflicts?

  • Are TNM files available for the project corridor to assess design changes if warranted?
RFP Development

• Include a statement in the RFP that the horizontal limits and heights of the recommended noise barriers shall not be changed except as approved by the Department

• Identify minimum top wall elevations in RFP if applicable

• Include language to minimize changes to top wall elevations

• Require 100’ versus 500’ cross sections for preliminary and subsequent design submittals

• Require DB firms to provide unit costs for design and construction of noise barriers

• Require DB firms to provide both PDFs and electronic design files for review
Confirming Limits of Recommended Noise Barriers in DB Design Plans

- Reviews of RFP and Design Phase Submittals (90%, 100% and RFC) – Roadway and Noise Barrier Plan Sets
  - Confirm Noise Barrier Types and Limits
  - Confirm Heights & Top Wall Elevations
  - Check Reasonableness of Top Wall Elevation Changes
  - Horizontal and Vertical Roadway Changes
  - Review of Cross Sections
  - Review of Proposed Drainage Systems including Locations of Stormwater Ponds
Design Plan Reviews

- Changes to ramp profiles can require modifications to barrier limits
- Sufficient noise barrier overlapping
  - 3 to 4 times distance between barriers
- Check for changes to cross slopes
Design Plan Reviews

- Review Locations of Changes in Top Wall Elevation
  - Property owner concerns related to changing heights in the middle of parcels
  - Confirm noise barriers extend beyond residential parcels
RFP Development and Design Plan

Reviews

• Consequences of a poorly written RFP can result in all sorts of issues
  • Schedule delays
  • Potential claims
  • Cost overruns
  • Less effective noise barriers
  • Public complaints

• Recommend noise analyst be actively involved throughout the DB Process!
QUESTIONS

Jim Mykytka, RS&H, Inc.
Brian Kirkpatrick P.E., RS&H, Inc.
Mariano Berrios, FDOT (Contributor)
Noise Barrier Design/Build Projects: Lessons Learned

AASHTO CEE Noise Practitioner Summit
October 2015
Noel Alcala, OhioDOT
Noise Barrier Design/Build Projects: Lessons Learned (Project Specific; Things to avoid)

- Bottom Of Wall Elevations In Analysis And DB Scope In Conflict With Field
- Insufficient Wall Sf In Scope Or Buried Wall Sf Is Not Included In The Quantities
- Inaccurate Noise Barrier Design Details In The Analysis.
- Distance Offset Of Wall From EOP In Conflict With Field
- Added Cost For A New Wall Can’t Be Added To DB Project. Must Be A Separate Project.
- Existing Ground Elevation In Scope Is Different Than What DBT Surveyors Shot
- Added Transparent Barrier Issue. Bottom Concrete Panel Too Tall
- Existing Utilities Found To Be In Conflict With Proposed Noise Wall Location. Not Clearly Described In DB Scope. Utilities Need To Be Clearly Described And Relocations Addressed In The DB Scope, If There Is A Conflict.
- Increased Sf For Smooth Tow Profile Rejected. Sf Evenly Distributed For Smoother TOWP. Added A Colored Sealer For The Panels. No Color On The Panels Suggestion Rejected.
Noise Barrier Design/Build Projects: Lessons Learned (General)

- Design Changes Causes Delays And Contracting Issues
- Fast Track Schedule, Hence, Reluctance To Address Minor Comments
- Less Flexibility And Reluctance To Make Changes
- Noise Wall Construction Plan Prep Schedule Is Unknown Until It Sells.
- Less Review Time; Less Issues Get Caught
- DOT Should Implement A Better System Of Checks And Balances.
- DOT Should Negotiate To Retain The Ability To Make Minor Changes To Project Scope Without Incurring Major Additional Costs Or Granting Time Extensions.
- We Identify Some Of These Items, Look At The Risk, Make A Decision On Whether Design Build Is Is Appropriate
Session 9 - Questions

Phillips, GA: What is the timing of Public Outreach to Vote on Wall Desire? Normally it is conducted after final design due to unforeseen design issues that could come up prior to committing to constructing a wall. (Issues Design build projects start constructing in one area before design is done on another. The noise wall area may not be able to be truly evaluated if the wall traverses through a phase I and phase II area, making it impossible to answer questions such as wall location, height, and sometimes feasibility if they are still doing coring looking at moment slab, existing retaining walls to see if they can or can’t be re-constructed...etc.)

Polcak, MD: Discuss general experiences (good and bad) with design/build projects involving noise barriers.
Session 9 - Questions

- Burcham, MO: What have states provided to contractors and what sort of follow-up analysis has been done? For example, what kind of re-evaluations occur when design changes (how do you get them to do it, contractually)?

- Newvine, OR: How do states make this work? Is there something in the project development process that leads to better outcomes when dealing with a Design/Build project?

- For Public Private Partnerships (P3), who is writing the proposal? Who is responsible for reevaluations?