

# Status and Options for Alternative Pavement Type Bidding

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# What is Alternate Bidding? ("Traditional" Sense)

- Agency (DOT) designs "alternative" sections for both HMA and PCC pavement
  - Sections may be designed to be equivalent in terms of design life (e.g., 20 year design)

*or*

  - An additional Life Cycle Cost Analysis (LCCA) component is taken into account in the bid price
- Contractor bids on the pavement type they are most confident in constructing

# How is Alternate Bidding Evaluated?

- Low Bid
- A+B+C Bidding
  - Agency computes bid adjustment factor (“C”) for both options using Life Cycle Cost Analysis
  - “C” is usually a product of: User Delay Cost + (periodic) Rehab Cost + Annual Maintenance Cost
  - “C” is added to the actual bid amount

# How is Alternate Bidding Evaluated?

- MoDOT
  - “C” factor applied only to asphalt alternative
  - Includes future Maintenance & Rehabilitation costs for asphalt alternative
- LADOTD
  - Use alternate bidding on all projects where  $\Delta$ LCC for alternatives are within 20% of each other
  - “C” factor includes Annual Maintenance, Future Rehabilitation, and User Costs.
- PennDOT
  - “C” factor accounts for future maintenance and user delay costs

# Benefits of Alternate Bidding

- Maintain competitive environment (particularly between PCC and HMA paving industries)
- Maximize available contractor effort (HMA and PCC paving contractors can bid on the same jobs)

# Benefits of Alternate Bidding

- Increases number of bids on projects

## Missouri DOT

Avg. 5.1 vs. 3.6 bids per project

## Louisiana DOTD

Avg. 3.9 vs. 2.6 bids per project

# Benefits of Alternate Bidding

- Maximize investment by agency

## Missouri DOT

- 2-year Average asphalt price/ton for alternate paving projects is 14% below that for non-alternate bid projects
- 2-year Average concrete price/CY for alternate paving projects is 17.4% below that for non-alternate bid projects

# Benefits of Alternate Bidding

- Maximize investment by agency

## Louisiana DOTD

Alternate Design Alternate Bid project bids ~9%  
lower than engineer's estimate

Other project bids ~20% higher than engineer's  
estimate

# Issues With Alternate Bidding

- Doubles the plans presentation for showing both alternatives
- Disagreement over the design-life/M&R cycle assumptions for different pavement types
- Agency must be transparent in alternate bidding procedures (e.g., computing the “C” factor, design, etc.)
  - Use Pavement Management System for determining M&R cycles for alternatives
  - Use AASHTO MEPDG for evaluating alternatives

# Issues With Alternate Bidding

- Computation of “C” factor – *what is included and when is it applied?*

## Missouri DOT:

- Apply “C” adjustment for projects >7,500 SY
- Includes future Maintenance & Rehabilitation costs for asphalt alternative
- “C” adjustment:
  - HMA: Mill & Overlay at 20 & 33 years
  - PCC: Diamond grind at 25 years

# FHWA Policy on Alternate Bids (1999)

- “The FHWA does not encourage the use of alternate bids to determine the mainline pavement type, primarily due to the difficulties in developing truly equivalent pavement designs.”
- “In those rare instances where the use of alternate bids is considered...
  - Engineering and economic analysis...should clearly demonstrate that there is no clear cut choice between two or more alternatives having equivalent designs.
  - Each alternative will be designed to perform equally, and provide the same level of service, over the same performance period and have similar life-cycle costs.”

# **FHWA Policy on Alternate Bids (2008)**

- “The performance (analysis) period should be long enough to cover at least one major rehabilitation cycle.”
- “LCC should be considered similar when the Net Present Value (NPV) for the higher cost alternative is within less than 10 percent higher than the lowest cost alternative.”
- “Incentive/Disincentive provisions should provide comparable opportunity for each alternate.”

# **FHWA Policy on Alternate Bids (2008)**

- Price adjustment clauses should not be used when using alternate bidding procedures.
  - Shifts risk for material cost escalation to the contractor
- If price adjustment factors are used to account for differences in LCC, approval under SEP14 is required.

A photograph of a road with a yellow center line leading towards a hazy, mountainous landscape. The text is overlaid on the image.

# **Alternate Bidding & Performance Specifications**

# Performance Specifications

- Definition of PS: Specifications that describe how the finished product should perform over time (*TRB*).

*or*

- Specification that states requirements in terms of the required results with criteria for verifying compliance, but *without stating the methods for achieving the required results.*  
(*DOD*)

# Benefits of Performance Specifications

- Economic Value
- Reduce Construction Time & Congestion
- Improve Quality
- Improve Service Life
- Clarify Roles and Responsibilities

# Benefits of Performance Specifications

- Encourage contractor innovation
- Reduce the risk to the owner agency (depending on contracting mechanism)
- Help ensure the agency gets the product that wants in the end

# **Performance Specifications & Alternate Bidding**

**How can Alternate Pavement Type Bidding facilitate the use of Performance Specifications for Rapid Renewal?**

**Would certain “Equal Performing” pavement type options allow a contractor to accelerate construction over others?**

# Performance Specifications & Alternate Bidding

- Focus on Product Performance not the color of the binder or pavement type.
- Allow Contractor to pick the pavement type based on experience, price, equipment availability, etc.
- Allow contractors to use alternative pavement layer procedures from standard state practices
- Require contractor to demonstrate their design meets performance requirements
- Keeping within the context of Rapid Renewal

**“Performance Bidding”**

# Performance Bidding

- Roles and Responsibilities:

## Agency

- 1) Establish Performance Requirements (functional) for the finished pavement without specifying the pavement type
- 2) Oversight, Management, Audit of construction

## Contractor

- 1) Select methods and materials (pavement type) to use to meet the performance requirements.
- 2) Construct the pavement in the most efficient and cost effective manner.
- 3) Integrate Time-Cost-Quality

# Alternate Bidding Contracting Scenarios

- Low Bid (Design-Bid-Build)

Agency

- Designs alternates for both pavement types.
- Awards to low bidder.
- *Risk for performance is on the Agency*

Contractor

- Bids on whichever option they can most economically construct and meet the construction acceptance criteria.
- *Low risk for contractor and very little room for innovation*

# Alternate Bidding Contracting Scenarios

- Example: MoDOT JSP for Alt. Pavement Projects

*“This work shall consist of a pavement composed of either Portland cement concrete or asphaltic concrete, constructed on a prepared subgrade in accordance with the standard specifications.”*

*“The bidder shall bid only one of the two alternates...”*

*“A sum of \$\_\_\_\_\_ (amount to be inserted by Central Office) will be added by the Commission to the total bid using the asphalt alternate for bid comparison purposes to factor in life cycle cost analysis of the roadway.”*

# Alternate Bidding Contracting Scenarios

- Design-Build without Warranty

Agency

- Provides pavement design life criteria and approves design from contractor.
- Provides design criteria and guidelines/standards for design of the pavement.
- *Risk for performance is on the Agency*

Contractor

- Designs and constructs pavement which can most economically achieve the construction acceptance criteria.
- *Little risk for contractor and little room for innovation*

# Alternate Bidding Contracting Scenarios

- Example: Maryland Inter-County Connector

*“The Design-Builder shall design pavement sections in accordance with the requirements set forth in the “1993 AASHTO Guide for Design of Pavement Structures” (1993 AASHTO) and the “SHA Pavement Design Guide.””*

*“The pavements shall have an initial structural design service life not less than 25 years for either pavement type. The Design-Builder shall maintain a consistent pavement type throughout each roadway element.”*

*Performance Requirements provided for: Structural capacity (thickness, strength, material quality), Ride quality, Skid resistance, and Visual Appearance.*

# “Performance Bidding” Contracting Scenarios

- Design-Build with Warranty

- Agency

- Provides pavement design life criteria and approves design from contractor.
    - Provides guidelines/standards for design of the pavement.
    - Establishes performance criteria during and at termination of warranty.
    - *Risk of performance shared with contractor.*

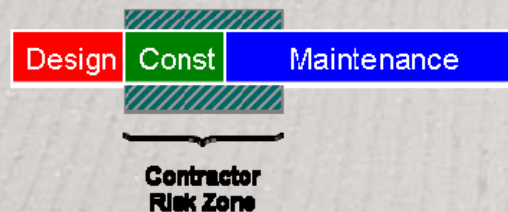
# “Performance Bidding” Contracting Scenarios

- Design-Build with Warranty

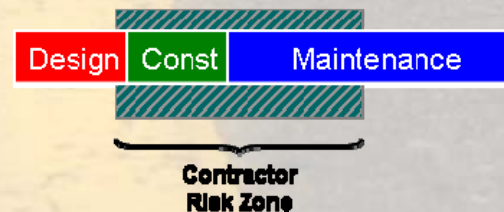
## Contractor

- Designs and constructs pavement which will achieve the performance requirements over the warranty period.
- Ensures that pavement will meet performance thresholds at end of the warranty period.
- Allows for some innovation by the contractor.
- Short term risk for performance during warranty period

### Material & Workmanship



### Short-Term Performance



# “Performance Bidding” Contracting Scenarios

- Design-Build-Maintain

- Agency

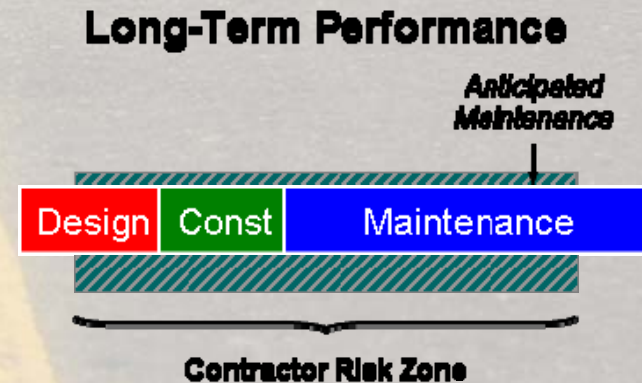
- Provides pavement design life criteria and approves design from contractor.
    - Provides performance criteria to be satisfied during the maintenance period.
    - Establishes requirements for addressing maintenance issues.
    - Shifts risk for performance mostly to contractor.

# “Performance Bidding” Contracting Scenarios

- Design-Build-Maintain

Contractor

- Designs and constructs pavement which will be most economical to construct and maintain at the required performance level during the maintenance period.
- Assumes most of the risk for performance.
- Allows for innovation by the contractor.



# “Performance Bidding” Contracting Scenarios

- Design-Build-Operate (PPP)

- Agency

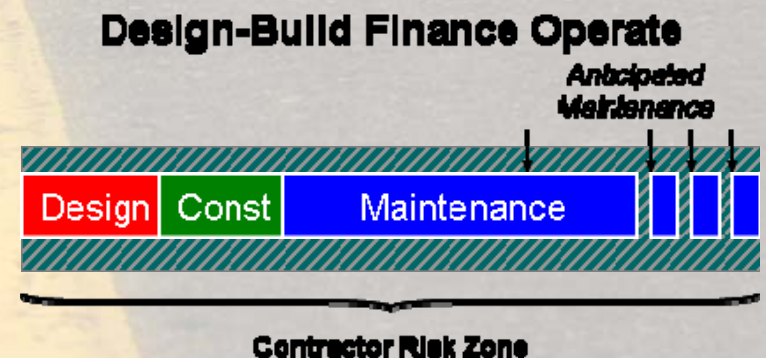
- Provides performance criteria to be maintained during the “operation” period and at “hand back” at the end of the operation period/lease.
    - Establishes timeframe for which performance issues must be addressed.
    - Virtually all risk on contractor.

# “Performance Bidding” Contracting Scenarios

- Design-Build-Operate (PPP)

Contractor

- Finances, designs, and constructs pavement which will ensure returns as soon as possible after the beginning of the operation period/lease.
- Assumes virtually all risk for performance.
- Allows for innovation by the contractor.



# Example

- Modular (precast) vs. Slipform PCC paving
  - Agency provides performance specifications which would permit precast pavement to be use.
  - Contractor may elect to use modular for certain areas (e.g., leave outs, bridge approach slabs, crossovers) or larger areas (e.g., intersections) of a project.
  - Performance Specifications would help ensure the agency gets what they want from the final product.
  - Permitting alternatives (modular pavement) will help the contractor achieve the requirements for “rapid renewal.”

# Performance Bidding

- Where is it going?
- Current conditions are dictating new approaches
  - Unstable construction/material prices
  - Reduction in DOT workforces for design and inspection
  - Budget cuts for construction and maintenance
  - Increase in PPP projects
  - Shorter timeframe for agencies to get projects together