Alternative Bidding by Pavement Type

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Background - Obsolete Guidance

• October 8, 1981 Federal Registry, p. 49842
  • Alternative bidding permitted for equivalent designs.

• November 9, 1981 Federal Registry Clarification, p. 55253
  • Discouraged the use of Price Adjustment Clauses with alternative bidding.

• April 8, 1999 - 23 CFR 626 Non-Regulatory Supplement
  • Alternative bidding to determine mainline pavement type not encouraged, due to difficulty in developing truly equivalent pavement designs

• These documents range in length form 1 - 3 pages in length
November 13, 2008 Memo

Clarification of FHWA Policy for Bidding Alternate Pavement Type on the National Highway System

http://www.fhwa.dot.gov/pavement/081113.cfm

Previous guidance is summarized.

Price Adjustments for pavement types based on a Life Cycle Cost Analysis (LCCA) is given an experimental approval process.

Notification that additional guidance is under review and development.
NCHRP 703 - Guide for Pavement-Type Selection

• Published in 2011.
• 70 pages
• Guidance on:
  • Pavement Life-Cycle Strategies
  • Life Cycle Cost Analysis
  • Analysis of Economic and Non-Economic Factors
• [http://www.trb.org/Publications/Blurbs/165531.aspx](http://www.trb.org/Publications/Blurbs/165531.aspx)
Technical Advisory T 5040.39
Use of Alternative Bidding for Pavement Type Selection

• Issued December 2012
  • Instructional Memorandum 3.505
    **Attachment A** - Alternative Bids

• Resends previous FHWA Policy

• FHWA considers alternative bidding by pavement type **suitable** for determining pavement type when an engineering and economic analysis does not indicate a clear choice between different pavement designs.

• **Alternative Bids by Pavement Type** allowable if:
  1. LPA’s Engineering and Economic Analysis does not indicate a clear choice between essentially equivalent pavement types.
  2. Pavement costs are a significant project cost and will have an impact on low bids.
  3. Pavement alternative is bid using **DS-15004, Best Value Alternative (A-D) Bidding**.
     - “D” is the difference between Net Present Values (NPV) of two alternative pavement types.
     - LPA will calculate “D” value using a Life Cycle Cost Analysis (LCCA) following guidance in FHWA’s *Technical Advisory on Alternative Bidding for Pavement Types Selection, T 5040.39*.

• **Recommended Approach for Locally Let Alternative Bidding by Pavement Type Projects**
Factors to Consider

• Equivalent Designs
• Discount Rate
• Consideration of Uncertainty
• Maintenance and Rehabilitation Strategy
• Non-Economic Factors
• Appropriate Application
Factors to Consider Equivalent Designs

• Equivalent Designs Provide:
  • Similar Level of Service over the Same Performance Period
    • At least one major rehabilitation cycle is included
  • Have Similar Life-Cycle Costs
    • Net Present Value for higher cost alternative is less than 10% greater than the lower cost alternative.

• Equivalent Design Tools:
  • AASHTOWare® DARWin-ME™ -- Detailed program inputs and a $5,500 annual fee
  • SUDAS Section 5F-1 - Pavement Thickness Design
  • Pavement Industry design programs

• Designs equivalent to the maximum extent possible.
Factors to Consider Discount Rate

- Life-Cycle Cost Analysis should estimate future costs in Net Present Values
- Use the Real Interest Rate (inflation removed) from the Office of Management and Budget (OMB) Circular A-94, Appendix C:
  - https://www.whitehouse.gov/omb/circulars_a094/a94_appx-c
- Additional FHWA Guidance:
  - Pavement Life Cycle Analysis Framework (July 2016)
Factors to Consider Uncertainty

• Consider in the development of a Life-Cycle Cost Analysis (LCCA):
  • Performance Life
  • Materials Costs
  • Construction Duration
  • Future Actions

• LCCA Tools
  • FHWA’s RealCost Software Program
    • http://www.fhwa.dot.gov/infrastructure/asstmgmt/lccasoft.cfm
  • LPA developed spreadsheet
  • Pavement industry software
Factors to Consider
Maintenance and Rehabilitation Strategy

• Each Pavement Alternative must includes an evaluation of the LPA’s Maintenance and Rehabilitation Strategy that:
  • Reflects the owner’s current practices
  • Utilizes real data from the owner’s pavement management system
    • System can be historical data on pavement maintenance costs
    • Alternatively it could be from a sophisticated system

Figure 5. Example pavement life-cycle model.
Factors to Consider
Maintenance and Rehabilitation Strategy

• Costs need to be comparable in today’s dollars for similar periods in a pavement’s life-cycle.
  • Rehabilitation of PCC pavement in 1996 vs. rehabilitation of ACC pavement of similar age and condition in 2006

• NCHRP Report 703, Guide for Pavement Type Selection, Section 3.5 describes an approach for developing Maintenance and Rehabilitation strategies.
Factors to Consider
Non-Economic Factors

- A LPA may consider the impact non-economic factors such as:
  - Constructability
  - Continuity of adjacent pavements
  - Available of local materials
  - Experience
  - Conservation of materials
Factors to Consider
Appropriate Application

• Alternative bidding by pavement type should only be used where pavement items are likely to influence the low bid on the project.

• Do not use on project where there are substantial:
  • Non-pavement items
  • Quantity differences of different pavement items.
Administration of Alternative Bidding Projects

- LCCA Bid Adjustment
- Commodity Price Adjustment
- Quality Price Adjustment Clauses
- Material Quantities
- Approvals and Change Orders
Administration of Alternative Bidding Projects
LCCA Bid Adjustment

• Utilize DS-15004, Best Value Alternative (A-D) Bidding
  • http://www.iowadot.gov/specifications/dev_specs/2015/DS-15004.pdf

• LCCA Determines the “D” value used in DS-15004

• The Net Present Value of all unique costs for future Maintenance and Rehabilitation activities over the performance period are considered.

• “D” Value must be published in bidding documents.
  • Locally let projects must also publish the “D” value.

• “D” Value adjustment does not include non-agency costs:
  • Work Zone User Delay
  • Vehicle Operating Costs
  • Environmental Costs
Administration of Alternative Bidding Projects
Commodity Price Adjustments

• Difficult to administer equal treatment to alternative materials.
• Not desirable in Alternative Bidding Projects.
Administration of Alternative Bidding Projects
Quality Price Adjustment Clauses

• Incentive / Disincentive Clauses must be similar for all alternatives.

• Examples:
  • Smoothness
  • Pavement Thickness
Administration of Alternative Bidding Projects
Material Quantities

• Same method of measurement should be used for all alternatives.
  • Section 2303 allows for payment of asphalt by area.

• Payment by weight or mass may result in material cost overruns
  • Higher agency costs from material overruns may invalidate the LCCA.
Administration of Alternative Bidding Projects Approvals and Change Orders

• Project must be awarded to low bidder including the deduction for the “D” value if applicable.

• Post-award change orders to add Alternative Bidding by Pavement Type is not allowed.
Final Thoughts

• Alternative bidding by pavement type is allowable if:
  • An Engineering and Economic analysis does not indicate a clear choice between essentially equivalent types.
  • Pavement costs are significant and will impact the low bid.
  • A Life-Cycle Cost Analysis is used to determine the cost difference between the pavement alternatives.

• An agency should give thought to how they are determining their pavement alternatives and LCCA.

• Be prepared to defend your decision to members of the public and the losing bidders.
Questions?

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Presentation available on-line at: https://doc.co/yzoQRU