

Design /Build
or
Innovation and Quality at the Lowest Cost

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Design/Build

- Design - process to analyze and solve problem(s) that results in a plan for construction.
- Build - Application of the plan resulting in a structure or structures.
- Engineer's Goal: "...to design the most cost effective structure to solve the problem with the given resources." Prof. Peller-Dean of Engineering Valparaiso University



Design/Build

- Why use design/build?
 - Lower owner costs,
 - Equal or higher levels of construction quality,
 - Longer Warranty Period.



Design/Build

Minnesota Projects

- TH 14
 - 50% PCC Westbound lanes
 - 50% HMA Eastbound lanes
- TH 52
 - PCC travel lanes and some shoulders
 - HMA ramps, frontage roads, shoulders and temporary pavements

Design/Build

Similarities between projects:

- 30% Concept design by DOT including
 - Pavement design
 - Pavement specifications
- 70% Finished design and drawings by contractor

Design/Build

Differences:

- TH 14
 - \$60MM
 - one bridge
- TH 52
 - \$240MM
 - 20 bridges
 - Technical Review and score

TH 52 Design/Build

Proposal Evaluation Scoring

- each proposal was given a technical score
- bid price was divided by technical score to determine low bid.

TH 52 Design/Build

Proposal Evaluation Scoring

- 15 person Technical Review Committee
- Scoring Categories
 - 40% Project Management
 - 30% Project Approach and Understanding
 - 25% Project schedule
 - 5% Alternate Technical Concepts and innovation



Th 52 Design/Build

40% Project Management -10 categories

- **Quality procedures**-compliance with DOT Spec
- **Proposer Organization**-how will handle problems
- **Management Experience**-previous project performance
- **Safety and Health Plan and Record**-compliance history
- **Partnering Approach**-communication with DOT, Railroads and Utilities

Th 52 Design/Build

40% Project Management -10 categories

- **Public Involvement and Community Outreach**-how will the proposer keep the community happy
- **Cost control**-how will track costs
- **Claims Adjustment**-how will the design-builder's finish on time
- **Management Strategies and Collocation**-keeping staff on track during project
- **Integration of Subcontractors and Third Parties**-

Th 52 Design/Build

30% Project Understanding-11 categories

- **Understanding the project**-coordination between all
- **Roadway Geometry and Earthwork Plan**-LCCA
- **Geotechnical Considerations**-plan for investigation and monitoring of vibration, pore-pressure, settlements, etc.
- **Environmental Permitting and Mitigation of Water Quality and Floodplains**-just how do you plan to keep DNR, EPA and environmentalist groups happy?
- **Hazardous Materials Management**-see above

Th 52 Design/Build

30% Project Understanding-11 categories

- **Aesthetics and Landscaping**
- **Utilities**-relocation design and construction
- **Construction Staging**-plan for maximizing construction with flexible acquisition schedule
- **Drainage**-just how do you plan to keep DNR, EPA and environmentalist groups happy and get the appropriate permits?
- **Bridges and Structures**-how will the bridges, retaining walls, noise barriers be designed using LCCA
- **Maintenance of Traffic**-minimize traffic delays

Th 52 Design/Build

25% Project Scheduling-3 categories

- Procedures for Tracking Progress
- “Meeting (and Advance Completion of) Completion Dates-Approach to insure project completion which meets or exceeds DOT goals.”
- Incorporation of Schedule of Values into Schedule-how will costs be tracked daily?

Th 52 Design/Build

5% Alternate Technical Concepts and Innovation (or value added engineering)- for items not related to pavement design:

- improved long term maintenance
- improved safety and design
- Other innovations

Th 52 Design/Build

HMA Warranty

- cracking
- debonding
- raveling
- flushing
- rutting
- popouts

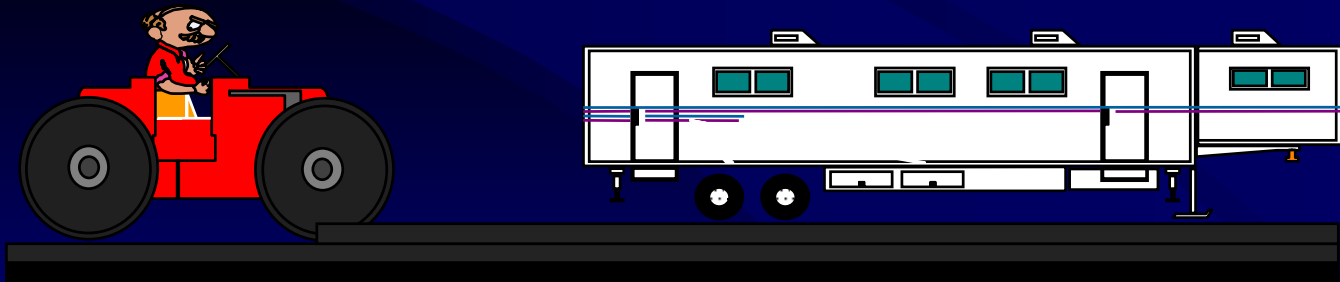
PCC Warranty

- cracking
- joint deficiencies
- delamination
- surface defects
 - shattered slab
 - scaling
 - popouts

Th 52 Design/Build

Warranties

- Up to 5 years
 - 1 year for grass
 - 5 years for HMA and PCC
- Agency monitors performance
- Remedy is specified (e.g. Mill & Overlay)




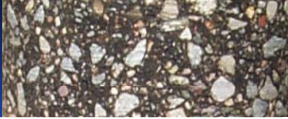

Th 52 Design/Build

The Bidding Results:

- Low bidder had highest technical score and lowest unadjusted bid price.
- 2nd place had the 3rd place technical score and unadjusted bid price.
- Last place had the 2nd lowest bid and 4th place technical score.

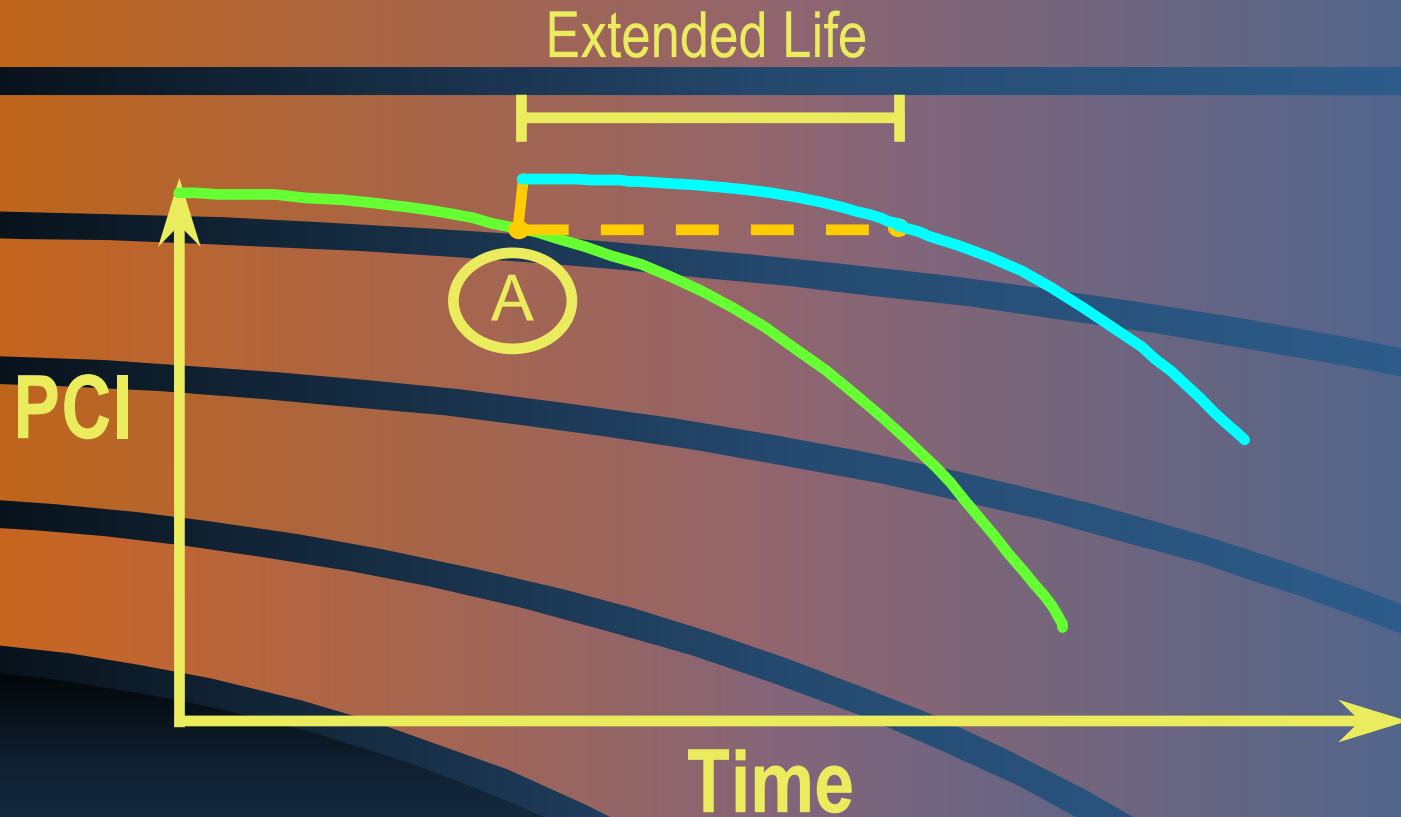
Design/Build-Suggestions

- Agency can clearly define minimum quality
- Value Engineering efforts are significant
- Agency understands total life cycle costs
- Warranty Provider has innovative solutions

12.5mm SUPERPAVE PG 70-28		1-3/4"
12.5mm SUPERPAVE PG 64-28		1-3/4"
25mm WARRANTY PG 58-28		3-3/4"



Long Term Pavement Performance



“Talk the Talk . . . or Walk the Walk?”

Mickey Hines - Koch

Design/Build-suggestions

- Warranty Provider detects/selects/does repairs
- Repairs are subject to Quality Measures
- Avoid Prescriptive Repairs - why?
 - Freezes Technology



Design/Build

- Clear Expectations of Performance
- Best Quality for Best Cost if Innovation is allowed.
- Warranties based on performance encourage innovation.



Design/Build

- Adding 1 year of life = 8% decrease in costs
- assuming \$100MM/yr
- savings \$8MM/yr

