

Comments to Florida Department of Transportation Pavement Type Selection Process

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Timing as to “When to do Pavement Type Selection” in the Project Development Process:

As discussed in the PTS Rule Development Workshop on June 23, 2010 when to do the Pavement Type Selection plays an important role because the selection of the pavement type help sets the construction budget (Phase 52). In the meeting, there were 3 basic approaches discussed as to “when” and “how” to do PTS:

1. Do the initial and life cycle cost estimate for both alternatives in Phase 22 to 32 and select the pavement on the results. Set the construction budget based on these estimates and use this pavement (no verification). This is how it is currently done.
2. Do the initial and life cycle cost estimate for both alternatives in Phase 22 to 32, select the pavement, and set the construction budget based on results. At approximately 6 to 12 months prior to construction verify the results. The problem with this is that at this point, if the pavement type changes, FDOT could be scrambling to develop a second set of plans. Furthermore, as the construction budget has been set, if the higher initial cost pavement is now the better alternative, FDOT may still not have enough money in the construction budget to select the new preferred alternate.
3. FDOT develops 2 sets of plans and competitively bids the 2 alternates using Alternate Pavement Bidding.

Of these 3 approaches, I believe that the Approach 3 leaves FDOT with the widest range of options and will yield FDOT the greatest reward.

Discussion

Alternate Pavement Bidding (APB) is a process that has been developed to consider the full costs of ownership of the structure (and not just the initial construction costs). It is used when the economic analysis shows no clear cut choice between equivalent designs. The primary advantages of the process are:

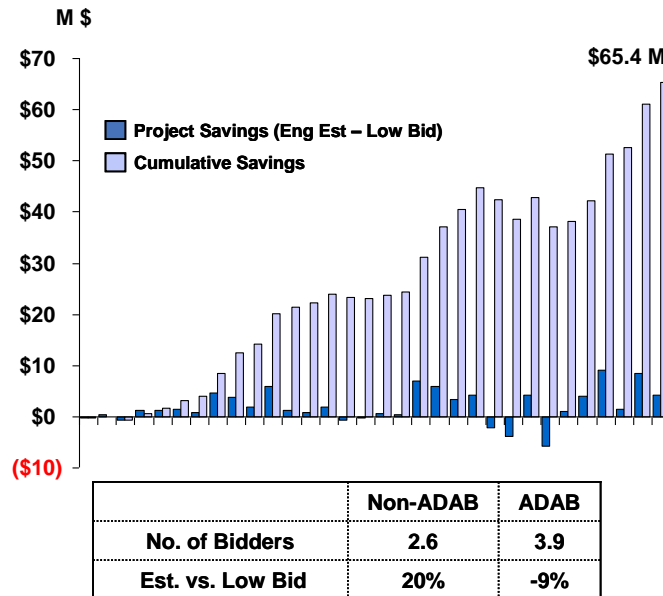
1. It increases the bid pool which has proven to result in lower bid prices to the contracting agency
2. It keeps an agency’s options open so that they can best capitalize on the conditions of the market. That is, if an agency makes a pavement type selection 3 years out, and market conditions change, it is very difficult for the agency to adjust to that change. However, by using APB, the agency has left its options open and it can let the market decide which is the better option.

According the Missouri Department of Transportation, the use of APB has resulted in an increased number of bidders from an average of 4.2 on non-APB projects to 5.5 on APB projects.

The increased competition has led to a “3-year average asphalt price/ton for APB projects being 5.1% below the 3-year average of non-APB projects and 4.8% below the 3-year average for all projects. Similarly, the 3-year average concrete price/CY for APB projects was 8.6% below of the price on non-APB projects and 2.8% below the 3-year average for all projects.”¹

Another state that has benefited from APB is Louisiana. Figure 1 is the cumulative savings that the Louisiana Department of Transportation and Development (LaDOTD) obtained for projects bid between June 2001 and December 2006. As can be seen, their cumulative savings for the 32 projects let during this time is over \$65 M.^{2,3}

Figure 1: Louisiana DOTD APB Savings
(32 Total Projects - 19 AC, 13PCC- for a Total Value = \$595 M)



The disadvantage of APB is that it requires a second set of plans to be developed and as such, the DOT has to balance additional plan development costs with potential savings due to additional competition. However, according to the LaDOTD, the second set of plans cost an average of 11% per project and overall the total Cost /Benefit Ratio for plan development and construction savings as been 1 / 1000 (every \$1 spent on plan development saved \$1,000 in construction).²

Recommendation

FDOT should adopt APB for all Major Reconstruction Projects (new alignment, widening, and reconstruction projects). As the process develops, it should be expanded into other types of projects especially lower volume applications where concrete overlays can be used. For example, in applications such as the US 1 Thin Whitetopping South of Edgewater. The concrete overlays

¹ MODOT Alternate Pavement Approach, Dave Ahlvers, Presentation to the 2009 AASHTO Subcommittee on Construction.

² Presentation: Alternate Design – Alternate Bid Using Life Cycle Cost Analysis, William Temple, Louisiana Department of Transportation and Development March 2007.

³ Agency Process for Alternate Design and Alternate Bid of Pavements, William H. Temple, Zhongjie Zhang, Kirk M. Zeringue and Jeff Lambert, Transportation Research Record No. 1900, Transportation Research Board, 2004

on this project are 6", 7" & 8" JPCP overlays built in 1988. After 21 years of service, there has been minimal maintenance and at last known review, there were 0 slabs cracked and the maximum fault was 0.04" fault (faulting becomes noticeable at approximately 0.04" to 0.06"). Meanwhile a nearby HMAC section has had mill/fill operations done 2 times since PCC overlay.⁴

For cost estimates in the Ph 52, FDOT should evaluate both the concrete and asphalt options and base the construction estimate on the higher value. Note: pavement costs are typically 40% to 60%^{5,6} of a new construction (based on project location and specifics) and a historical initial construction cost differential between asphalt and concrete pavements has been approximately 15% to 20% (non-MEPDG designs). This means that using the higher cost construction estimate will add between 6% and 12% to the project costs.

For the transition phase, select a given number of projects (eg 10) at various time frames to construction (eg. 6 months to 18 months) and develop alternate designs and force the project through the APB process. Maintain the current construction cost estimates. Base the concrete designs on MEPDG and consult with concrete pavement industry or other experts to make sure designs are appropriate.

⁴ FDOT District 5 Concrete Pavement Tour, May 2009. Tour for the TRB Rigid Pavement Construction Committee

⁵ ACPA Awards database of 380 projects from 1997-1999 and 2007-2009.

⁶ NC DOT, for Non-bridge Projects for NCDOT Projects Bid April 12, 2010.