

Indiana Department of Transportation
Initial Evaluation Report
For
Special Experimental Project 14, SEP-14
Alternate Bids on Pavement Type
Contract No. R-30106 & R-31948, US 31 at Kokomo, Indiana
November 17, 2009

A. Introduction

On April 1, 2009 the Federal Highway Administration approved the innovative contracting process of the Indiana Department of Transportation (INDOT) for alternate bids on pavement type for US 31 project in Howard County. This process involved two distinct sets of bids on one project, one for Hot Mix Asphalt (HMA) pavement and another one for Portland Cement Concrete Pavement (PCCP). A Present Worth (PW) cost was calculated for future maintenance costs of both pavement types using an established Life Cycle Cost Analysis (LCCA) Strategy. This PW cost was added to the respective total bid amounts after the bids were opened on May 20, 2009, but the PW cost was only used to determine the low bidder. See attached Work Plan for SEP 14 dated April 1, 2009.

B. Analysis

INDOT received eleven (11) bids (6 PCCP and 5 HMA) and all bids were substantially below the engineer's estimate. Bidding this project using two separate bid packages (Plans, Specifications and Contract Documents) allowed contractors who work with both types of pavements to bid on both contracts. Three (3) contractors participated in both pavement type bids (see Bidders B, C, & E below in Bid Analysis Summary).

Traditionally INDOT would receive five or six bids using conventional bidding practices where the pavement type was selected ahead of the bidding. INDOT averaged 5.1 bidders per contract for twenty-two (22) "New Road Construction" between May 1, 2008 and June 1, 2009. By performing this process, INDOT received more bids than expected. This proves that the alternate bidding for pavement type attracted more bidders.

The low bid amount, out of all 11 bids, was for HMA pavement (Bidder B) but after adding PW cost of HMA and PCCP to the respective pavement type bids, one of the PCCP bids was the low bid (Bidder A). PCCP contract R-30106 was awarded and HMA pavement contract R-31948 was rejected.

Using the Mechanistic Empirical Pavement Design Guide (MEPDG) INDOT provided the following two pavement design thicknesses for the mainline on this project: 10 inches of PCCP and 14 inches of HMA. INDOT then utilized the FHWA real cost software to perform LCCA with an established strategy to calculate a PW cost for both pavement types over a service life of fifty (50) years. See attached US 31 Alternate Bid PW Cost Calculations and LCCA Worksheet. This LCCA provided a PW cost of \$1,403,938.00 for HMA and \$870,480.00 for PCCP. Estimated costs used to calculate the PW cost are from the data base maintained by the INDOT Office of Pavement Engineering. This data base is populated with actual historic bid costs on pavement items. In the LCCA the data from the previous five (5) years was used, this is standard procedure for INDOT. INDOT does not use a User Cost in their LCCA. Future maintenance of traffic costs were included in the calculations.

Bid Analysis Summary

<u>PCCP Bidders</u>	<u>Initial Bid</u>		<u>PW Cost for PCCP</u>		<u>Bid Analysis</u>
A	\$11,273,863.10	+	\$870,480.00	=	\$12,144,343.10
B	\$11,734,858.25	+	\$870,480.00	=	\$12,605,338.25
C	\$11,882,813.21	+	\$870,480.00	=	\$12,753,293.21
D	\$12,489,884.99	+	\$870,480.00	=	\$13,360,364.99
E	\$13,049,350.43	+	\$870,480.00	=	\$13,919,830.43
F	\$13,380,701.06	+	\$870,480.00	=	\$14,251,181.06
<u>HMA Bidders</u>	<u>Initial Bid</u>		<u>PW Cost for HMA</u>		<u>Bid Analysis</u>
B	\$11,098,853.08	+	\$1,403,938.00	=	\$12,502,791.08
C	\$11,342,588.69	+	\$1,403,938.00	=	\$12,746,526.69
G	\$12,047,454.98	+	\$1,403,938.00	=	\$13,451,392.98
E	\$12,547,049.20	+	\$1,403,938.00	=	\$13,950,987.20
H	\$14,670,217.40	+	\$1,403,938.00	=	\$16,074,155.40

INDOT compared the estimated cost with actual low bid costs of both pavement types. The following table shows the cost comparison with low bid of those pavement items that were relative to the mainline pavements and relative to this alternate bid for pavement type. All other items in the bids were common to both types of pavement. Shoulders and "S" Lines are to be HMA.

Cost Comparison of Unique Items						
Bid Item	Bid Quantities	Estimated Cost of Item Per Unit	Low Bid Cost of Item Per Unit	Range of Bid Costs of Item Per Unit	Average Bid Cost of Item Per Unit	HMA or PCCP Bid
QC/QA PCCP, 10 IN.	66,359 yd ²	\$37.34	\$22.85	\$22.85 - \$32.75	\$25.98	PCCP
QC/QA PCCP, 8 IN.	16,353 yd ²	\$34.41	\$24.85	\$20.56 - \$32.00	\$24.15	PCCP
Subbase for PCCP	21,273 yd ³	\$36.24	\$27.50	\$24.81 - \$36.14	\$28.53	PCCP
D-1 Contraction Joint	42,021 ft	\$9.90	\$8.25	\$7.85 - \$8.50	\$8.17	PCCP
QC/QA-HMA, 4, 70, Surface	6,230 TON	\$69.0	\$57.90	\$57.90 - \$67.00*	\$60.11	HMA
QC/QA-HMA, 3, 70, Surface	1,350 TON	\$68.77	\$62.40	\$58.50 - \$71.00*	\$63.34	HMA
QC/QA-HMA, 4, 70, Intermediate	10,403 TON	\$48.40	\$39.90	\$39.90 - \$58.50*	\$45.42	HMA
QC/QA-HMA, 3, 70, Intermediate	2,268 TON	\$53.90	\$42.90	\$42.90 - \$63.00*	\$48.01	HMA
QC/QA-HMA, 4, 64, Base	29,147 TON	\$46.40	\$38.40	\$38.40 - \$55.50*	\$44.54	HMA
QC/QA-HMA, 3, 64, Base	5,459 TON	\$48.20	\$40.90	\$40.90 - \$60.50*	\$45.29	HMA
QC/QA-HMA, 5, 76, Intermediate, OG	13,921 TON	\$53.90	\$42.90	\$42.90 - \$70.00*	\$51.04	HMA

* Bidder H was significantly and consistently higher on all the items.

The above table shows that pavement item bids are lower than the estimates used in evaluation. This indicates that a true cost saving was realized by INDOT in this process. INDOT believes using this process of alternate bids for pavement type selection was very successful.

The table below compares some common HMA items found in both PCCP and HMA bids to check for unbalanced bids. These bids appear to be consistent and no anomalies were found.

Cost Comparison of Some Common Items Used in Both PCCP and HMA					
Bid Item	Bid Quantities	Low Bid Cost of Item Per Unit	Range of Bid Costs of Item Per Unit	Average Bid Cost of Item Per Unit	HMA or PCCP Bid
QC/QA-HMA, 2, 64, Surface	1,306 TON	\$62.50	\$62.50 - \$70.03	\$63.76	PCCP
QC/QA-HMA, 2, 64, Surface	1,306 TON	\$60.90	\$60.90 - \$69.00	\$61.64	HMA
QC/QA-HMA, 2, 64, Intermediate	2,132 TON	\$50.00	\$50.00 - \$56.03	\$51.01	PCCP
QC/QA-HMA, 2, 64, Intermediate	2,132 TON	\$46.15	\$46.15 - \$61.00	\$49.46	HMA
QC/QA-HMA, 2, 64, Base	5,025 TON	\$45.75	\$45.75 - \$51.26	\$46.67	PCCP
QC/QA-HMA, 2, 64, Base	5,025 TON	\$40.90	\$40.90 - \$58.50	\$45.54	HMA

INDOT contacted both the Asphalt and Concrete industry representatives after the contract was awarded for their comments about this process. Their comments are as follow:

- 1) The Contractors want the PW cost published before bid opening so they can factor in their bid amount.
- 2) Some Contractors commented that there are far too many maintenance activities such as joint seals every 3 years on HMA pavement.
- 3) Some Contractors want to have alternate pavement options for Shoulders also.

This is the first experimental project INDOT has let for alternate pavement type. Currently INDOT selects the pavement type by an established Pavement Type Selection (PTS) process and utilizing the FHWA real cost software. INDOT does not have enough data at this point to compare which process is most economical. INDOT considered this alternate bid process successful; therefore, the PTS committee selected ten more projects for alternate pavement type at the June, September & November 2009 meetings. INDOT will be seeking approval from the FHWA for another SEP 14 to bid these ten additional projects using this process. Nine of the additional projects are also on new alignment, one is a total reconstruction.

C. Conclusion

The primary reasons INDOT participated in this innovative contracting practice for an alternate pavement type bidding was:

1. Attract more bidders and competition.
2. Obtaining true cost savings over similar conventional bid projects.
3. Provides a more competitive market, i.e. lower bid costs on paving items using this procedure versus the standard procedure where the pavement type is pre-determined.

The process was successful; our data indicated that we attracted over twice the bidders than traditionally and realized a lower cost than the estimates we use for evaluation. INDOT does not have enough data at this point to compare whether this process is most economical or whether this process promotes more competitive bid prices.

INDOT saved the tax payers approximately \$325,518 by using this process (\$12,502,791.08 - \$12,144,343.10), HMA Bidder B minus PCCP Bidder A, minus INDOT's consultant cost of \$32,930.00 for producing two sets of plans. The in-house costs for INDOT were determined negligible.

The PW cost for future maintenance did impact the bids and which contractor received the contract. The comments received from the contractors are mostly positive. However, the contractors believed that if INDOT published the PW cost before bids were opened then this would attract more bidders. INDOT will not publish the PW cost on future alternate bids due to the possibility of unbalanced bids.

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