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# Implementing Best-Value Procurement for Design–Bid–Build Highway Projects

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1 **IMPLEMENTING BEST-VALUE PROCUREMENT FOR DESIGN-BID-**  
2 **BUILD HIGHWAY PROJECTS**

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## **ABSTRACT**

State departments of transportation (DOTs) have typically used low-bid procurement to deliver design-bid-build (D-B-B) highway projects. While low-bid procurement has provided predictable results for state DOTs, it does not always result in the best performance during and after construction. Thus, state DOTs are increasingly using alternative methods such as best-value procurement to assure project quality and enhance project performance. In essence, best-value procurement incorporates price with other factors to achieve specific project goals. Compared to low-bid procurement, best-value procurement offers several advantages that can include opportunities to improve project quality, promote innovation, and enhance project performance. To date with a couple of exception, state DOTs have only used best-value procurement for design-build (D-B) projects. This paper explores the procedures and existing practices for implementing best-value procurement in D-B-B project delivery. Data were collected from a literature review, a survey questionnaire, and case studies. Three best-value D-B-B projects from Michigan, New York State, and Oregon DOTs are presented. The research results showed that the use of best-value procurement for D-B-B project delivery can provide other benefits to state DOTs in addition to what was found in the literature such as emphasizing non-price factors that align with project objectives, reducing risk and saving cost.

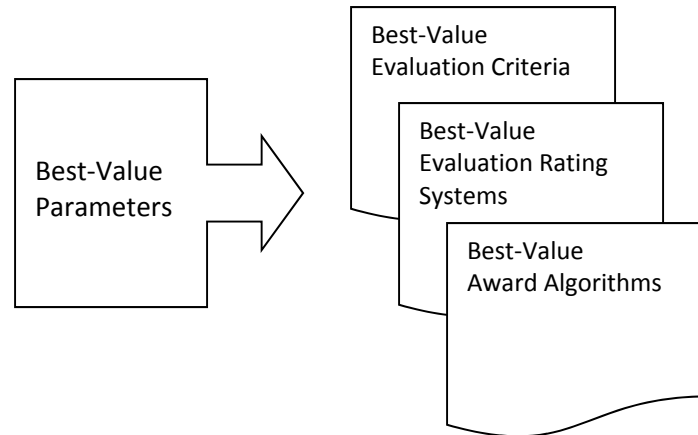
## 1 INTRODUCTION

2 State departments of transportation (DOTs) have historically used a low-bid approach to procure  
3 traditional design-bid-build (D-B-B) projects. Under the low-bid approach, price is a sole  
4 competitive factor. Non-price factors such as qualifications, experience, technical approaches,  
5 and innovative solutions are not considered. Typically, state DOTs award a contract based on  
6 the lowest responsive bid. Research has identified several advantages of using low-bid  
7 procurement including: potential for monetary savings (1), easy and simple implementation,  
8 reduced protests and disputes (2), a long-standing legal precedence and enhanced competition  
9 (3), and a transparent selection process (4). However, low-bid procurement does not always  
10 offer the best performance during and after construction. Because past performance is not a  
11 factor in low-bid awards, contractors with a record of delivering high quality projects are less  
12 likely to be awarded the contracts in low-bid contracting (5, 6). In the words of one author, this  
13 creates a situation where the agency is in effect subsidizing marginal performance, which in turn  
14 reduces the incentive for excellent performers to continue their superior performance (6). As a  
15 result, a number of DOTs are increasingly using best-value procurements.

16 In contrast to the traditional low-bid procurement, best value aims at enhancing the long-  
17 term performance through selecting the contractor with an offer most advantageous to the owner  
18 when selection factors other than price are also considered (3). These other factors may include  
19 items such as technical solutions, managerial merits, financial health, and past performance.  
20 Time, cost, image, aesthetics/appearance, operation and maintenance, managerial safety, and  
21 environment aspects can also be relevant factors in best-value procurements depending upon  
22 unique project goals (7, 8). Best-value procurement places emphasizes on efficiency and  
23 effectiveness, quality, value of money, and performance standards (9). The core benefits of  
24 using best-value procurement are twofold. First it requires the contractor to develop detailed  
25 project and procurement plans in the early phase of the project development process. Second, it  
26 necessitates procurement solicitations that encompass accurate selection criteria and rating  
27 systems (7). Research has shown that the main goal of using best-value procurement for  
28 transportation projects is to select the contractor who has the optimum combination of price and  
29 technical capabilities (10). Molenaar and Johnson (10) stated that “When used correctly, a best-  
30 value selection rewards those who propose innovative concepts that enhance product quality or  
31 lower the price for providing quality. When used incorrectly, owners may introduce  
32 inappropriate biases into the selection process or add cost to the procurement.”

33 National Cooperative Highway Research Program (NCHRP) Project 10-61, “Best-Value  
34 Procurement Methods for Highway Construction Projects,” developed best-value framework that  
35 has been referred to by most state DOTs who are implementing their best-value procurement (3).  
36 Figure 1 presents the best-value concept at an operational level. The overall process includes  
37 four distinct concepts: best-value parameters; evaluation criteria; evaluation rating systems; and  
38 award algorithms. The interpretation and recommendations for applying these concepts were  
39 presented in detail in NCHRP Report 561 (3).

40



**FIGURE 1 Best-value concepts** (Adapted from NCHRP Report 561)

It is important to note that although best-value procurement is increasingly in use for highway projects, it is most frequently applied in conjunction with design-build (D-B) project delivery. A comprehensive review of literature found that while a number of guidance documents are available for implementing best-value procurement on D-B projects, limited guidance is available for the use of best value on traditional D-B-B highway projects. Minnesota DOT's manual for the best-value procurement published in 2013 is perhaps the only document explicitly addressing the application of best-value procurement on D-B-B project delivery (11). The Minnesota DOT manual provides a concise approach for implementation, but it also indicates that future research is needed to expand the D-B-B best-value approach (11).

Building upon relevant literature, the objective of this paper is to examine how to apply best-value procurement in highway D-B-B project delivery. The following sections provide background, present the study methodology, and discuss the research results and findings in detail.

## **BEST-VALUE LEGISLATION AND REGULATORY FRAMEWORK**

Legislation and regulations for public sector construction at the federal and state levels are moving towards greater use of contracting approaches to achieve the "best-value" for dollars expended. In some cases, particularly at the state level, statutes specifically address the use of best-value selection in conjunction with competitive sealed bidding. The Federal Acquisition Regulation (FAR), Part 15: Contracting by Negotiation, sets forth best-value concepts under a competitive acquisition (12). Best-value under the source selection process might entail the selection of the lowest-priced technically acceptable proposals or it may consist of a trade-off between price and other factors, resulting in the selection of a proposal without the lowest price.

Many federal and state agencies have implemented various source selection methods and have developed instructions or procedures for development and implementation of these methods. At the federal level, the U.S. Postal Service, the Army, the Navy, the Department of Veterans Affairs, and the Federal Bureau of Prisons have developed procedures and guidelines for source selection contracting applicable to their construction programs (13). Though federal legislation has not explicitly directed the use of best-value for highway construction, the Federal Highway Administration (FHWA) has for many years allowed alternative procurements using best-value concepts embedded in trial or experimental contracting methods for selected highway

1 projects through its Special Experimental Project (SEP-14) initiative. For example, *Title 23*  
2 *U.S.C. 112(b)(3)* provides the FHWA's statutory requirements for the design-build project  
3 delivery method in which best-value selection is allowed to select the most appropriate  
4 contractor.

5 At the state level, various statutes have addressed best-value under both competitive  
6 sealed bidding and alternative contracting for public works contracts. Statutes addressing best-  
7 value in the context of competitive bidding are of particular interest for this research. Minnesota  
8 enacted a law that enables public agencies to select proposers based on best-value in 2007. This  
9 legislation includes: "Any personnel administering procurement procedures for a user of best-  
10 value procurement, or any consultant retained by a local unit of government to prepare or  
11 evaluate solicitation documents must be trained, either by the department or through other  
12 training, in the request for proposals process used for best-value contracting for construction  
13 projects" (11). It is noted that this best-value authority does not extend to D-B contracting.  
14 Minnesota DOT's authority for D-B best value contracting is provided in separate state statutes  
15 161.3410 through 161.3428 (11).

16 The Delaware Code (29 Del. C § 6962) allows the use of best-value procurement for  
17 large public works contracts in conjunction with a determination of responsiveness through pre-  
18 qualification. In Delaware if an agency elects to award based on best-value, the agency must  
19 first determine that the successful bidder is responsive and responsible. The determination of  
20 best-value is then based upon objective criteria that have been communicated to the bidders in  
21 the invitation to bid. Objective criteria are assigned a weight consistent with the following: (1)  
22 price must be at least 70% but no more than 90% and (2) schedule must be at least 10% but no  
23 more than 30%.

24 Similarly, many other state DOTs allow the use of best-value procurement for their  
25 transportation projects. Through a national survey conducted in 2014, NCHRP Synthesis 471,  
26 "Practices for Developing Transparent Best Value Selection Procedures," reported that 24 state  
27 DOTs have best-value legislation. However, it is important to note that some best-value  
28 legislation is specific to the highway sector while other legislation is more general for all state  
29 construction projects. In fact, much of the best-value legislation reported in NCHRP Synthesis  
30 471 was tied to D-B project delivery (4). For traditional D-B-B projects, state DOTs are required  
31 to submit their work plan for FHWA SEP 14 approval of using best-value procurement.

## 32 33 **RESEARCH APPROACH**

34 The research approach included three primary tasks:

- 35 1. Conducting a literature review—synthesizing existing documentation related to best-  
36 value procurement;
- 37 2. Performing data collection—gathering information on current practice and identifying  
38 agencies that warrant additional investigation using a survey questionnaire and  
39 communication with state DOT representatives; and
- 40 3. Conducting case studies—empirically investigating, analyzing and verifying the results  
41 and conclusions. The following sections describe these tasks in detail.

### 42 43 **Literature Review**

44 The research team conducted a comprehensive literature review of related best-value documents.  
45 The goal of this effort was twofold. The research team searched academic literature, industry  
46 publications, state DOT websites, and government reports to find the most current trends and

1 practices in best-value procurement. Additionally, the team searched archival information to  
2 describe the origins of best-value procurement and how it has evolved into the current state-of-  
3 practice. The literature review was conducted by using TRB Transportation Research  
4 Information Systems, general internet search engines, academic databases, ASCE civil  
5 engineering database, and the FHWA research library.

6 As previously mentioned, while a number of best-value documents are available for state  
7 DOTs to implement best-value for the D-B delivery method, there is a limited availability on the  
8 use of best-value procurement for traditional D-B-B projects. To better understand the  
9 opportunity of implementing best-value in conjunction with the D-B-B delivery method, the  
10 research team conducted a national survey of state DOTs.

### 11 **Data collection**

12 The research team developed a questionnaire based on the finding from the literature review and  
13 conducted a survey of state DOTs. The questionnaire was developed base on the principles  
14 suggested by Oppenheim (14). The survey questionnaire was distributed in a web-based form to  
15 the members of the AASHTO Subcommittee on Construction and the AASHTO Subcommittee  
16 on Design in all 50 states, the District of Columbia, and Puerto Rico. The committee members  
17 were asked to forward the survey to the person best qualified to respond from an overall  
18 departmental basis. After two follow-up requests, the research team received responses from 46  
19 state DOTs (88% response rate). It is important to note that the survey questionnaire asked the  
20 participants to describe not only their state of practice related to the best-value D-B-B approach,  
21 but their perception regarding the use of best-value procurement for D-B-B projects.

22 The survey results indicated that 19 state DOTs currently use, or are able to use, best-  
23 value with D-B-B delivery. Based on these responses, the research team contacted the  
24 representative of these 19 state DOTs to further investigate how best-value procurement can be  
25 implementing with the D-B-B delivery method. From the information provided, the authors  
26 chose best-value D-B-B projects for case studies that aligned best with the goals of this study.

### 27 **Case Studies**

28 According to Yin (15), case studies are the preferred research method when: the research  
29 problem is on a contemporary phenomenon within a real-life context; dealing with “how” and  
30 “why” research questions; and the researcher has little control events. In addition, the case study  
31 approach is more explanatory in this research due to the lack of existing frameworks on  
32 implementing best-value procurement for D-B-B delivery methods. As a result, the case study  
33 approach is a suitable research methodology (15) and is a main research tool for this study.

34 In this step, the research team conducted phone interviews with DOT representatives.  
35 Due to length constraints in this paper, the authors chose cases from Michigan, New York, and  
36 Oregon DOTs because they best illustrate the state of practice. During the interview, guidance  
37 documents, templates, tools, and checklists, and other transmittals were obtained to enhance  
38 validity. In each case study, the research team followed a rigorous case study protocol including:

- 39 1. project description;
- 40 2. the rationale of using best-value procurement;
- 41 3. best-value legislation;
- 42 4. best-value evaluation criteria;
- 43 5. selection methodology; and
- 44 6. case summary.

1           Once case study interviews were completed, the raw information and relevant documents  
2 collected were analyzed and integrated with data from other sources. A detailed description of  
3 each case study is presented below.

## 4 5 **CASE STUDY ANALYSIS AND RESULTS**

6 Table 1 provides a description and some key features of the case studies analyzed in this paper.  
7 As previously mentioned, the case studies were selected based on the national survey and  
8 communication with state DOT representatives. Table 1 indicates that all three case projects  
9 were rehabilitations. The contract award varied approximately from \$49 million to \$146 million.  
10 Adjusted bid and weighted criteria were two best-value algorithms used for these three case  
11 study projects. Best-value algorithms are the steps taken by the owners to combine best-value  
12 parameters, evaluation rating systems, and evaluation criteria to make a final award  
13 recommendation. In the adjusted bid algorithm, technical proposals are scored first and the price  
14 proposals are opened. The project price is adjusted by the technical score. The project is  
15 awarded to the proposer with lowest adjusted bid. The contract price is based on the amount  
16 listed in the price proposal. In the weighted criteria algorithm, the technical proposal and the  
17 price proposal are evaluated individually. The technical evaluation factors and the price are  
18 assigned weights depending on their importance. The total score of the proposal is calculated by  
19 the sum of these evaluations and the project is awarded to the proposal with the highest score.  
20 While it cannot be completely attributed to the best-value process, it is notable that all projects  
21 were bid below the engineer's estimate. The remainder of the paper details the case studies.

22  
23 **TABLE 1 Case Study Project Summary**

Case Study Projects	State DOTs	Location	Construction Type	Engineer's estimate (\$ million)	Contract award (\$ million)	Best-value algorithm
M-39 Southfield Freeway	Michigan	Detroit, Michigan	Roadway reconstruction	77.3	71.3	Adjusted Bid
Patroon Island Bridge Project	New York	Albany, New York	Interstate, bridge rehabilitation	174.1	145.8	Weighted Criteria
I-84 Sandy River - Jordan Road Project	Oregon	Multnomah, Oregon	Bridge replacement	65.4	48.5	Weighted Criteria

### 24 25 **Michigan DOT: M-39 Southfield Freeway Project**

26 The major work of this project included reconstruction of the roadway and rehabilitation of 28  
27 bridges. The project, completed in 2011 was on a major urban freeway that is primarily a  
28 commuter route, linking western suburbs and the city, and interchanging with other major urban  
29 freeways, such as I-94, I-96 and M-10, and other principal urban arterials. The engineer's  
30 estimate at the time of project advertisement was \$77.3 million. The project was awarded using  
31 best-value selection with the cost of \$71.3 million.

#### 32 33 ***Best-value rationale***

34 The majority of the project work had a significant impact on a residential area northwest of  
35 Detroit. In recognition of the importance of the roadway to the adjacent community and other  
36 stakeholders, and the impact the freeway and its rehabilitation has on the neighborhoods,  
37 Michigan DOT engaged extensively with the local community. Additionally, the Michigan DOT



1 conducted a very thorough public involvement process the design phase to understand and  
 2 address the community's needs, concerns, and ideas for the project. Three public meetings were  
 3 held to provide information relating to the project and to solicit ideas and feedback from the  
 4 community. Outreach with the community and other stakeholders revealed several "Quality of  
 5 Life" concerns consistently cited (16). As a result, Michigan DOT decided using best-value  
 6 procurement as a means to establish acceptable criteria for the quality of life issues.

### 7 ***Best-value legislation***

8 Michigan DOT received an SEP-14 approval for this project in October 2010. In the original  
 9 SEP-14 document, Michigan DOT proposed to select the contract based on the best-value  
 10 weighted criteria algorithm. The final score was calculated by using a weighted average method  
 11 giving 60% weight to the bid price and 40% weight to the technical proposal score. As the SEP-  
 12 14 document was being finalized, it was determined that the best-value adjusted bid algorithm  
 13 would be used (16). Michigan DOT also engaged the Michigan Attorney General's office to  
 14 obtain feedback on the risk and legality of the specifications before advertising the project.  
 15

### 16 ***Best-value evaluation criteria***

17 As previously mentioned, the quality of life concern was of paramount in this project. As a  
 18 result, the evaluation criteria related to this concern were assigned significant weight.  
 19 Specifically, the best-value evaluation criteria consisted of the following issues: (1) general  
 20 construction concerns, including the impact of construction activities on air quality, noise, traffic,  
 21 utility, and damage to neighborhood property; (2) local contractor and workforce participation;  
 22 (3) safety and mobility; and (4) schedule. Table 2 provides more information on these criteria  
 23 along with their maximum scores.  
 24

25 **TABLE 2 Summary of Evaluation Criteria - Michigan DOT**

Evaluation Criteria	Maximum Score
Air quality	40
Noise	40
Restricting construction truck traffic on neighborhood streets	40
Maintaining utilities to homes during construction	40
Avoiding damage to adjacent property from vibration.	40
Local Contractor and Workforce Participation	150
Safety & Mobility	100
Schedule	50

27  
 28 It was noted that during the development of the best-value special provisions, the Michigan DOT  
 29 met with the FHWA and members of the construction industry to solicit feedback on the  
 30 language and logistics of what the Michigan DOT was asking of the industry. For example, for  
 31 the air quality and noise concerns, the Michigan DOT worked with the Michigan Department of  
 32 Environmental Quality, and other experts to establish baseline measurements for particulate  
 33 matter in the air, and ambient decibel levels. In addition, Michigan DOT hired an independent

1 third party review of the specifications and project plans to ensure bidability and constructability  
2 (16).

3 To enhance objectivity and consistency of the best-value selection process, the Michigan  
4 DOT included a detailed instruction to score the evaluation criteria. The evaluator was asked to  
5 provide comments on each component of evaluation criteria. The Michigan DOT also  
6 recommended that “determining in advance the details of the scoring procedures the team will  
7 use, such as what the starting score for each factor where minimum requirements are met will be,  
8 and would include this information in the special provision for best-value selection” (16).

9

### 10 ***Best-value selection process***

11 The Michigan DOT used the adjusted bid algorithm (composite score) to select the contractor for  
12 this project. The composite score was calculated by dividing the contractor bid amount by their  
13 technical score. The consensus scoring process was structured to be as objective as possible. A  
14 diverse cross section of Michigan DOT staff comprised the evaluation team, including:

- 15 • Detroit Transportation Service center (TSC) Manager;
- 16 • Detroit TSC Development Engineer;
- 17 • Detroit TSC Delivery Engineer;
- 18 • Metro Region Engineer;
- 19 • Metro Region Planning Specialist;
- 20 • Director of the Small Business Development; and
- 21 • Contract Services Division Administrator.

22

23 For each evaluation criterion, the team started with a baseline score, and added points for  
24 good ideas and innovative thinking. Emphasis was placed on developing a consensus score for  
25 each evaluation criterion, taking into account input from the entire team. Consensus scores and  
26 comments were recorded, and each team member signed the score sheets.

27 To maintain and enhance transparency of the selection process, Michigan DOT held a  
28 mandatory Pre-bid Meeting/DBE Reverse Trade Fair to expose the local workforce and potential  
29 DBE contractors to potential prime contractors. Michigan DOT staff provided an overview of  
30 the project and answered contractor questions regarding the nature of the work and the logistics  
31 of the best-value selection. Furthermore, the technical proposal scores were publicly announced  
32 and the bids were downloadable.

33

### 34 ***Summary***

35 The Michigan DOT indicated that this best-value project was successful. They highlighted that  
36 under the traditional low-bid procurement, it was not easy to address the concerns of the  
37 community in this project. While the low-bid contracting method provides the ability for  
38 contractors to propose value engineering alternatives after award to save money, there is little  
39 incentive for contractors to propose value engineering approaches that that add value to the  
40 affected community. Conversely, the best-value process put the owner agency between the  
41 contractor and the community, pushing the contractor to perform above contract requirements in  
42 response to community feedback. The Michigan DOT concluded that they learned much about  
43 the best-value process that will help them to use it where most appropriate in the future (16).

44

45 **New York DOT: Patroon Island Bridge Project**

1 The Patroon Island Bridge is a heavily used commuter route and provides an important  
2 connection between the Northway, Interstate 787 and the Thruway. The project involves  
3 rehabilitation of the Patroon Island Bridge and all the ramps comprising the I-90 interchange  
4 with I-787. The major work of this project includes replacing the bridge decks and bearings,  
5 repairing steel and painting the bridges, as well as replacing or repairing the substructures of the  
6 interchange and replacing the concrete bridge piers. The engineer's estimate was \$174.1 million.  
7 The project was awarded using best-value selection with the cost of \$145.8 million. The project  
8 began in 2013 and is expected to be completed in 2016 (17).

### 9 ***Best-value rationale***

11 This bridge project is located in a high volume corridor including the Interstate 90 over the  
12 Hudson River between Albany and Rensselaer counties, as well as the ramps creating the I-90 /  
13 I-787 interchange. The speed of construction and mitigating the impacts of construction on the  
14 traveling public was the critical success factor. It was essential that the selected contract has a  
15 proven record in high volume corridors with complicated maintenance and protection of traffic  
16 staging. In December 2012, New York DOT announced that this D-B-B project was no longer  
17 low-bid and determined that best-value procurement would meet the best interests of the State.  
18 New York DOT stated that the use of best-value selection methods for traditional D-B-B  
19 construction contracts has the potential for significant benefits in terms of shorter duration to  
20 complete work, improving quality, and safety (18). The best-value procurement allows the New  
21 York DOT to consider and evaluate critical aspects of the project in addition to price.

### 22 ***Best-value legislation***

24 New York State DOT submitted the work plan for SEP-14 review and approval to use of best-  
25 value alternative bidding practices for the capital construction program dated April 2012. New  
26 York State enacted Chapter 56 of the Laws of 2011, known as the infrastructure Investment Act  
27 that authorizes a variety of innovative contracting methods including best-value procurement  
28 (18).

### 29 ***Best-value evaluation criteria***

31 The project is complex. Most work occurred at night to mitigate the traffic disruption because the  
32 bridge carries an average of 70,000 vehicles daily. The six-lane bridge maintains two lanes in  
33 one direction and one lane in the opposite direction during construction. Six technical evaluation  
34 criteria included: schedule; driver first; technical approach; key personnel; past performance; and  
35 presentation as seen in Table 3. Due to the impact on the traveling public, New York State DOT  
36 put a heavy weighting on the driver first and technical approach criteria. The objective of the  
37 driver first criterion was to encourage proposals that have the least impact on the traveling  
38 public. The objective of the technical approach criterion was to enhance innovation techniques,  
39 address potential issues and risks, and optimize the sequencing and phasing of the work. Table 3  
40 summarizes the technical criteria and their final weight.

41

1  
2**TABLE 3 Summary of Technical Evaluation Criteria - New York State DOT**

<b>Technical Evaluation Criteria</b>	<b>Final Weight (50% total)</b>	<b>Ranking Points (100 points total)</b>
Schedule	5%	10
Driver First	20%	40
Technical Approach	10%	20
Key Personnel	5%	10
Past Performance	5%	10
Presentation	5%	10

3

4 It is noted that the minimum acceptable combined Score for the first five Technical  
5 criteria (prior to the Presentation) was 63 Points (70 percent of 90 potential points). Any firm  
6 scoring lower than this was removed from further consideration. New York State DOT provided  
7 instruction and specification how to score these criteria in the bid document information. The  
8 second component in the best-value evaluation criteria is cost or price. The final weight of cost  
9 was 50%. A total of 100 Cost Ranking Points was assigned to the contractor with the lowest bid.  
10 Remaining bids received Cost Ranking Points based on the percent that their bid exceeds the  
11 low-bid (19).

12

### 13 ***Best-value selection process***

14 After evaluating technical and price proposals, the three proposers with the highest subtotal  
15 scores (technical score + cost score) plus any proposal within 10 ranking points of the proposal  
16 with the highest subtotal score was offered the opportunity to provide oral presentations (19).  
17 The objective of the oral presentation was to increase the understanding of the submittal on  
18 technical evaluation criteria. A selection committee included main and/or regional office staff  
19 that evaluate and score technical qualifications.

20

21 To enhance objectivity and fairness of the selection process, the selection committee was  
22 kept strictly separate from cost proposals and scoring. The selection committee met as a group  
23 and agreed on consensus scores for each technical evaluation factor for each proposer. The  
24 selection committee was asked to provide comments as appropriate. Additionally, New York  
25 Contract Management Bureau oversaw the selection committee meeting, compiled all technical  
26 evaluation criteria scores with cost scores and comments, and determined the proposer that  
27 represents the best-value to the New York State DOT (17).

28

### 29 ***Summary***

30 The New York State DOT has typically used the D-B-B delivery method with a low-bid process  
31 to award a majority of capital construction contracts. The best-value selection process that has  
32 been employed recently and has proven to be beneficial to the department (18). New York State  
33 DOT has identified several advantages of using the best-value contract including: (1) reducing  
34 risk to the department; (2) providing a more flexible process; and (3) truly generating best-value  
35 to the department. However, the New York State DOT recognized two main limitations of  
implementing best-value. Comparing to the low-bid approach, the submission preparation of the

1 best-value approach is time consuming and costly. The other limitation involves extra time  
2 required to be able to evaluate and select the best-value contractor.

### 4 **Oregon DOT: I-84 Sandy River - Jordan Road Project**

5 This project involved the replacement of two structurally deficient bridges on Interstate 84 in  
6 Multnomah County. The bridges are located at the gateway to the Columbia River Gorge  
7 National Scenic Area. The existing Sandy River bridges were replaced with four span steel box  
8 girder bridges. Each bridge consists of three 12-foot lanes and two 12-foot shoulders. The  
9 eastbound bridge includes a 16' wide multi-use path on the south side. The engineer's estimate  
10 of this project was \$65.4 million. The project was awarded using best-value selection with the  
11 cost of \$48.5 million. The project began in 2010 and completed in 2014 (20).

#### 13 ***Best-value rationale***

14 The Oregon DOT traditionally uses a low-bid process, but has concluded that using the low-bid  
15 approach for the D-B-B delivery method may entail an unacceptable risk for this project (20).  
16 As a result, Oregon DOT decided using best-value procurement as a means to accomplish the  
17 required work for this project.

18 The project is located in the commercial and recreational travel corridor. Because of the  
19 lack of alternative access routes, the I-84 traffic lanes must be maintained during construction. A  
20 temporary bridge was required to allow for demolition of the existing bridges and construction of  
21 the replacement bridges without impacting I-84 traffic. Additionally, the project had several  
22 complicated construction constraints and technical requirements that require a contractor with  
23 specialized expertise in designing and constructing a bridge with steel box girders and drilling  
24 eight foot diameter shafts with post-grouting which both are not commonly used in Oregon.  
25 Furthermore, the ability of the contractor to complete necessary in-water work within each of the  
26 constrained six-week in-water work windows for this project location is critical to meeting the  
27 project schedule.

#### 29 ***Best-value legislation***

30 The Oregon legislation (ORS 366.400) authorized Oregon DOT to enter into all contracts  
31 deemed necessary for the construction, operation, maintenance, improvement, or betterment of  
32 highways (20). The Exemption Number 2009-03 granted the Oregon DOT to use best-value  
33 procurement for the I-84: Sandy River-Jordan Rd Project (21). This procurement method  
34 encompasses the Oregon Legislature's focus on economic efficiency and stimulation and  
35 provides recognition of the value to the public of employing enhanced contracting methods to  
36 accomplish the required work in the most effective manner (20).

#### 38 ***Best-value evaluation criteria***

39 The relative weight of price and technical evaluation criteria for this project was 70% and 30%  
40 respectively (22). The Oregon DOT determined that the contractor must be able to develop and  
41 follow an accurate work plan that incorporates the large variety of work items in this project. To  
42 be successful, Oregon DOT also required excellent communication and coordination among key  
43 individual in addition to the contractor's qualifications, technical approach and diversity element  
44 (22).

45 The technical evaluation criteria included four categories: bidder's experience; key  
46 individuals; technical approach; and diversity. Table 4 summarizes the sub-criteria and their

1 maximum of these four categories. The total of the maximum technical score is 100 points. As  
 2 previously mentioned, this project is several complicated construction constraints and technical  
 3 requirements. Table 4 also indicates that Oregon DOT assigned heavy weights to the technical  
 4 approach category.

5  
 6 **TABLE 4 Summary of Technical Evaluation Criteria - Oregon DOT**

Evaluation Criteria	Sub-criteria	Maximum Points (Total 100 points)
Bidder's Experience	Steel Girder Bridges	6
	Difficult Foundations	6
	Short In-Water Work Windows	6
Key Individuals with similar project	Project manager and Superintendent	6
	Project manager's Experience	3
	Superintendent's Experience	2
	Environmental Manager's Experience	1
	Diversity Manager's Experience	1
Technical Approach	Years of Experience in Role	8
	Project Approach	21
	In-Water Work Approach	16
Diversity	Girder Erection Approach	8
	Workforce Diversity Development	3
	Utilizing Disadvantaged Business Enterprise	3
	Subcontracting, Consultant and Supplier Plan	10

7  
 8 To maintain objectivity and fairness of the selection process, Oregon DOT provided a  
 9 detailed instruction on how to score each technical evaluation criterion in the bid booklet. The  
 10 technical criteria were evaluated and scored based on content, conformance, clarity and  
 11 completeness, quality of work plan approaches, and bidder qualifications. Oregon DOT also  
 12 included non-voting members during the scoring process (22).

#### 13 14 ***Best-value selection process***

15 Oregon DOT used the best-value weighted criteria algorithm to select the contractor. The  
 16 technical evaluation committee consisted of agency personnel and discipline experts. Each  
 17 evaluation committee member separately evaluated and scored the technical for each bidder.  
 18 After that, the evaluation committee discussed their evaluations and scores of the technical  
 19 component for each bidder. Finally, the evaluation committee agreed upon and provided a single  
 20 technical component score for each bidder (22). It is noted that Oregon DOT reserved all rights  
 21 to require any clarification it needed to understand a bidder's technical component.

#### 22 23 ***Summary***

24 Oregon DOT reported that on typical construction projects, the traditional low-bid contracting  
 25 process has demonstrated predictable success. However, for complex and complicated projects,  
 26 best-value procurement provides greater opportunity for the contractor to add significant value to

1 the project. Based on the success of using best-value selection method for the D-B program,  
2 Oregon DOT employed best-value procurement of this D-B-B project. Oregon DOT recognized  
3 several benefits, including: (1) providing a mechanism for agencies to obtain more value for their  
4 money; (2) reducing agency's risk, change orders, and cost overruns; and (3) creating economic  
5 benefits to the public by inclusion of many entities in subcontracting and supply opportunities  
6 (23).

## 8 **CONCLUSIONS**

9 The D-B-B best-value approach has been successfully implementing by several federal agencies  
10 such as the U.S. Army Corps of Engineers, the U.S. Department of the Navy, and the Federal  
11 Aviation Administration (3, 20). State DOTs are increasingly using best-value procurement to  
12 deliver their highway projects. However, the majority of agencies who use best-value  
13 procurement use it only for their D-B project delivery programs. This paper presents three case  
14 study projects with the successful implementation of best-value procurement with the traditional  
15 D-B-B delivery method.

16 The findings from this research shows that the D-B-B best-value approach can provide  
17 benefits to state DOTs such as emphasizing non-price factors that align with project objectives,  
18 reducing risk, and cost savings. All three state DOTs believe that using this approach has the  
19 potential for significant benefits. There was no logistical problem in executing the best-value  
20 selection and the awarded contractor was able to meet and exceed all performance measures  
21 (16). Compared to the traditional D-B-B low-bid approach, the D-B-B best-value approach can  
22 increase chance for success and decrease overall risk to the department by selecting a contractor  
23 based on their capability to complete all critical aspects of the project rather than just price alone  
24 (18). Similarly, Oregon DOT indicated that using best-value with D-B-B projects may provide  
25 better overall value, reduce change orders, and shorten project duration (23).

26 There are several disadvantages of implementing the best-value process. New York State  
27 DOT mentioned that the process may take longer than a traditional low-bid process. The extra  
28 time is often required for evaluating and selecting the best-value contractor. In addition, the  
29 preparation and submission process can be more time consuming and costly than the low-bid  
30 process (18). State DOTs require additional time and efforts for the preparation of bid  
31 documents and evaluation plans. The Oregon DOT indicated that a minimum of eight months  
32 and additional \$20,000 should be budgeted to account for extra staff work for large and complex  
33 projects (24). Oregon DOT also pointed out that best-value procurement is suitable for a project  
34 that has: unique technical requirements (e.g., a project requires expertise that may be difficult to  
35 meet if using low-bid procurement); and potential for cost savings (24).

36 This research has found that, while many advantages exist, the best-value approach  
37 cannot guarantee the success of a D-B-B project. Instead, owner agencies should work closely  
38 with FHWA and the industry to determine when best-value procurements align with project  
39 objectives. On appropriate projects, best-value procurement can improve project delivery  
40 success.

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