1. Quantitative Cost – Technical Tradeoff
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What is it?

In this variation of best value procurement, the STA implements a scoring system that examines the incremental opportunities of price and technical benefit. The technical score increment is determined by identifying the highest technical score then dividing that highest score by the next highest score. Price score is determined in the same manner. Then, the contract is awarded to the lowest cost unless the technical benefits of a higher cost bid offer justifiable benefits to the project (*1*).

Why use it?

Quantitative cost – technical tradeoff is a best value method that allow certain jurisdictions that require the technical and price portions of a proposal to be evaluated separately to use best value for procuring a construction firm. Then, the STA can compare the technical portion score/rating to the price portion score/rating and justification can be made for selecting a proposal that is not the lowest priced proposal, but provides the best overall score/rating when comparing across both technical and price of the received proposals (*2*).

What does it do?

In some instances, STAs using best value procurement will want to utilize the lowest cost proposal, but the project may include specific technical aspects that are crucial to project success. Quantitative cost – technical tradeoff allows for a simplified low bid procurement, but allows for justification of selecting a higher priced proposal based on justifications made for the technical aspects.

How to use it?

NCHRP report 561 (*1*) provides guidelines for using quantitative cost – technical tradeoff procurement:

1. Screen the candidate project and determine its potential to accrue benefits by using best-value procurement. If the project appears to be a good candidate, capture the essential screening criteria that made it a good candidate and rank them in order of importance to the project.
2. Develop qualifications, technical, schedule, and cost evaluation as appropriate based on the screening criteria. For each evaluation criterion, the owner must develop a measurable standard against which responsiveness will be measured.
3. Publish the best-value RFQs. The solicitation will contain the following items as a minimum
4. Description of scope of work
5. SOQ forms
6. Contract completion date or days
7. List of qualifications evaluation criteria with corresponding standards
8. Description of process to be followed for the best-value proposal evaluation plan
9. Description of what constitutes a non-responsive SOQ
10. Receive SOQ.
11. Evaluate SOQs against published standards and determine which statements are fully responsive and meet the qualifications criteria.
12. Announce the list of prequalified firms.
13. Publish the best-value RFPs. The solicitation will contain the following items as a minimum:
14. Scope of work and relevant plans and specifications
15. Proposal forms
16. Contract completion date or days (if applicable)
17. Method to carry forward Step 1 qualifications ranking/ scores into final evaluation (if applicable)
18. Best-value proposal evaluation plan listing the technical, schedule, and cost evaluation criteria with corresponding standards
19. Description of what constitutes a non-responsive proposal
20. Evaluate proposals against published technical, schedule, and cost standards and determine which proposals are fully responsive in meeting the qualifications criteria.
21. Eliminate any non-responsive proposals from the competitive range.
22. Roll-up evaluation results and determine the final technical point score for each responsive proposal.
23. Open price component of responsive bids and order them by increasing price proposal.
24. To calculate the incremental technical score, the highest technical score is divided by the next highest technical score minus one and multiplied by 100%. The incremental price score is calculated by dividing the highest price by the next highest price minus one and multiplied by 100%. The formulas to use are as follows:

$$T\_{increment}=\left[\left(\frac{T\_{j}}{T\_{i}}\right)-1\right]×100\%$$

$$P\_{increment}=\left[\left(\frac{P\_{j}}{P\_{i}}\right)-1\right]×100\%$$

$$If T\_{increment}<Increment, award proposal$$

$$If T\_{increment}>P\_{increment}, the retain proposal j for possible award$$

$$ and repeat with proposal\_{j+1}$$

$$Repeat process until T\_{increment}>P\_{increment}$$

$$T=technical score$$

$$P=price proposal$$

1. The STA awards the project to the lowest price proposal, unless a higher priced proposal can be justified to be awarded the project based on a high technical value. The justification is made by determining whether the added increment of price is offset by an added increment in technical score.

When to use it?

Quantitative cost – technical tradeoff is the best option for STAs in jurisdictions that allow best value procurement, but require that the price portion and technical portions are evaluated separately and recorded as such in the review process (*1*).

Limitations?

Using quantitative cost – technical tradeoff can be seen as a more subjective selection process. The STA compares the technical portion value against the proposed price using a rating or scoring system that relies on the knowledge that the STA has of a project. This can be worrisome for STAs in that firms that are not awarded the project could protest the selection, especially if a firm has the lowest price, but does not understand why the technical portion received a lower score/rating that eliminated that firm from consideration.

Who uses it?

United States Forest Service Highways, FHWA

Example

The United States Forest Service utilized quantitative cost – technical tradeoff best value procurement for the Coffman Cove highway project located in Coffman Cove, Alaska in 2003 (*1*). The Project consisted of upgrading an approximately 3-mile segment of a single-lane logging road to a double-lane public highway. Work included grading, drainage, base, aggregate surfacing, and other supplementary work. Additionally, work included maintaining 18 miles of a single-lane bypass road.

Proposing firms provided a technical component and a separate price component. The technical score was determined by having each board member first provide a numerical rating for each evaluation criteria in the Technical Proposal. The consensus method was used by the Board to determine a final numerical rating for each evaluation criteria. The revised numerical ratings were then summed to determine the overall technical score for each proposal. The maximum possible overall technical score was 1,000 using a direct point scoring system. Evaluation factor used included schedule, past project performance, key personnel, subcontracting plan, small business utilization plan, project management plan, quality management plan, environmental protection approach, and technical solutions.

After the overall technical scores were assigned, the Price Proposals were opened. A best-value cost-technical tradeoff was determined using the following steps:

1. The proposals were first ranked in order of price (Contract Bid Price plus Contract Administration Cost), starting with the lowest price. The following is an example of the initial ranking according to price:

|  |  |  |
| --- | --- | --- |
| Offeror | Contract Bid Price plus Contract Administration Cost | Overall Technical Score |
| C | $5,600,000 | 845 |
| D | $5,905,000 | 912 |
| A | $6,300,000 | 880 |
| B | $6,470,000 | 95 |

A cost-technical tradeoff will then be performed by comparing the top two initially ranked proposals. A Price Increment (P.I.) and a Technical Score Increment (T.I.) will be computed by the following equations:

$$P.I. =\left(\frac{Price\_{Offerer D} - Price\_{Offerer C}}{Price\_{Offerer C}}\right)× 100\%$$

$$P.I. =\left(\frac{5,905,000 – 5,600,000}{5,600,000}\right)×100\%=5.45\%$$

$$T.I. =\left(\frac{Tech Score\_{Offerer D}-Tech Score\_{Offerer C}}{Tech Score\_{Offerer C}}\right)×100\%$$

$$T.I. =\left(\frac{912 – 845}{845}\right)×100\%=7.93\%$$

The T.I. over P.I. ratio was then examined. If the ratio was greater than one (1), as in this example, than the second-ranked Offeror (D) is considered to provide a greater value to the Government:

$$\frac{T.I.}{P.I.} = \frac{7.93\%}{5.45\%} = 1.46$$

1.46 > 1.00 ; therefore, Offeror D is considered to provide a greater value (Technical Increment outweighs the Price Increment). Offeror D is retained for the next step, while Offeror C is eliminated.

If the T.I. over P.I. ratio had been less than one (1), then Offeror C would have been considered to provide a greater value to the Government.

1. A cost-technical tradeoff was then performed by comparing the higher-ranked proposal from the step above (Offeror D) to the next proposal listed in the initial ranking chart (from above, Offeror A). A P.I. and T.I. will be computed similar to above:

$$P.I. =\left(\frac{Price\_{Offeror A}-Price\_{Offeror D}}{Price\_{Offeror D}}\right)×100\%$$

$$P.I. =\left(\frac{6,300,000-5,905,000}{5,905,000}\right)×100\%=6.69\%$$

$$T.I. =\left(\frac{Tech Score\_{Offeror A}-Tech Score\_{Offeror D}}{Tech Score\_{Offeror D}}\right)×100\%$$

$$T.I. =\left(\frac{880-912}{912}\right)×100\%=-3.51\%$$

Then, the T.I. over P.I. ratio was examined:

$$\frac{T.I.}{P.I.}=\frac{-3.51\%}{6.69\%}=-0.52$$

Since the ratio was less than one, Offeror D continues to be considered as providing the greater value. In this case, the Technical Increment decreased while the price increment increased. Offeror D is retained for the next step, while Offeror A is eliminated.

1. Lastly, a cost-technical tradeoff was performed by comparing the higher-ranked proposal from above (Offeror D) with the next proposal listed in the initial ranking chart (Offeror B). The P.I. and T.I. are calculated similar to above:

$$P.I. =\left(\frac{Price\_{Offeror B}-Price\_{Offeror D}}{Price\_{Offeror D}}\right)×100\%$$

$$P.I. =\left(\frac{6,470,000-5,905,000}{5,905,000}\right)×100\%=9.57\%$$

$$T.I. =\left(\frac{Tech Score\_{Offeror B}-Tech Score\_{Offeror D}}{Tech Score\_{Offeror D}}\right)×100\%$$

$$T.I. =\left(\frac{965-912}{912}\right)×100\%=5.81\%$$

The T.I. over P.I. ratio will then be examined:

$$\frac{T.I.}{P.I.}=\frac{5.81\%}{9.57\%}=0.61$$

Since the ratio is less than one, Offeror D continues to be considered to provide a greater value. In this case, the Technical Increment did not outweigh the Price Increment. Offeror D is retained while Offeror B is eliminated.

The proposal offering the best value for the Coffman Cove highway project (Offeror D) was then forwarded to the selection official.

References

1. Scott, Sidney, Keith R. Molenaar, Douglas Gransberg, and Nancy C. Smith. *NCHRP Report 561:* *Best-Value Procurement Methods for Highway Construction Projects*. National Cooperative Highway Research Program, Transportation Research Board, Washington DC, 2006.
2. *Performance Contracting Framework Fostered by Highways for LIFE.* Federal Highway Administration, <https://www.fhwa.dot.gov/construction/contracts/pubs/framework/09.cfm> [Accessed: March 27, 2014].