

# VALUE ENGINEERING

## (Part 2)

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### COST REDUCTION INCENTIVE SPECIFICATION

The Missouri State Highway Department considers its *Cost Reduction Incentive Specification* to be "value engineering." This specification has been included in all highway construction contracts awarded by the Missouri State Highway Department since October 1975. This specification permits the contractor to submit proposals for changing the plans, specifications, or other requirements of the contract for the purpose of reducing the total cost of constructing the project.

If the contractor's proposal is accepted, the Missouri State Highway Department shares the cost savings with the contractor on a 50/50 basis. Five such proposals have been approved by the Missouri State Highway Department and they are as follows.

### VALUE ENGINEERING SAVES MONEY—EXAMPLE PROJECTS

1. On Route 50, Jackson County, the contractor submitted a proposal to modify the method of handling traffic, which allowed the bridge to be redecked with full width pours in lieu of the three-stage construction provided in the contract. This materially reduced the time required to complete the project, eliminated two longitudinal joints, and provided a greater degree of safety to traffic and workmen. This resulted in a savings to the state in the amount of \$27,236.

2. On Route I-35, Daviess County, the contractor proposed to pour intermediate diaphragms on a precast girder bridge in advance of the deck construction rather than monolithically with the deck as provided in the contract. It was determined that his proposal had no negative affect on design and would result in a savings in time and cost. The net savings to the state was \$2,034.

3. On Route I-229, Buchanan County, the contractor proposed to arrange for the inspection of fabricated structural steel at the

fabricating plant in Japan rather than at the job site. The specifications provide that the state had the option of requiring the fabrication inspection at the job site. The net savings to the state was \$22,072, and the contractor also assumed the cost of inspecting the steel in Japan.

4. On Route I-70, Saline County, the contractor requested to change from System C to System B paint for structural steel. This resulted in a savings to the state of approximately \$7,000.

5. On Route I-229, Buchanan County, the contractor proposed to pour the intermediate diaphragms in advance of the deck construction. This is similar to Item 2. Net savings to the state was \$1,349.

## REQUIREMENTS FOR PROPOSALS FROM CONTRACTORS

The *Cost Reduction Incentive Specification* used in Missouri provides that the contractor must submit to the engineer, in writing, such proposals and that they must be for the sole purpose of reducing the total cost of construction. The proposal must contain a description of both the existing contract requirements and the proposed changes. An itemization of the contract requirements that must be changed if the proposal is adopted is also required. A detailed estimate of costs of performing the work under the existing contract and under the proposed change is required. The proposal must also contain a statement of the time within which the engineer must make a decision and the contract items of work affected by the proposed change, including any quantity variation attributable to the change.

## BASIC DESIGN MUST NOT BE CHANGED

Proposals which seek to change the basic design of a bridge or a pavement type are not considered. The contractor is required to continue to perform the work in accordance with the requirements of the contract until a change order, incorporating the cost reduction proposal, has been approved.

### *State Engineer Judges Proposal Acceptability*

Under Missouri's specifications the engineer is the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the contract bid prices if, in the judgment of the engineer, such prices do not represent a fair measure of the value

of work to be performed or to be deleted. The specification also provides that the contractor may be required to share in the costs of investigating a cost reduction proposal submitted by the contractor.

#### *State Has Right to Apply Changes to Other Contracts*

If a cost reduction incentive proposal is accepted, it is documented by means of a change order, which sets forth the price for performing those items of work affected by the proposal and the net savings and authorizes the changes contained in the proposal. Contract time is not extended unless it is specifically provided for in the cost reduction proposal. The right is reserved by the department to adopt a cost reduction proposal for general use on contracts administered by the department when it is determined that such proposals are suitable for application to other contracts.

For reference, a copy of the Missouri State Highway Department *Cost Reduction Incentive Specification* is attached—see appendix.

## PROCESSING COST REDUCTION INCENTIVE PROPOSALS

The processing of cost reduction incentive proposals is quite simple. Such proposals are sent to the division of construction for initial screening. If such a proposal is found to be in compliance with the specification, it is then forwarded to all affected divisions for evaluation. If a proposal is found not to be in compliance with the specification, it is rejected and returned to the contractor.

After the affected division or divisions have evaluated the proposal, it is returned to the construction division with recommendations. The construction division then submits the proposal to the assistant to the chief engineer, operations, with the appropriate recommendations, for approval.

If the proposal is accepted, the construction division advises the contractor and implements the change by means of a change order. If the proposal is rejected, the construction division advises the contractor and states the reasons for rejection.

## PROPOSALS NEW AND FEW—MORE EXPECTED

Relatively few cost reduction proposals have been submitted by contractors on Missouri State Highway Department projects. This is due partly to the fact that the specification is relatively new and probably many contractors are not thoroughly familiar with it. It is

considered to be of tangible benefit to both the contractor and the state highway department.

Missouri's *Cost Reduction Incentive Specification* is very definitely value engineering and occurs after the contract has been awarded, which I believe to be the proper time to apply value engineering.

## RULES PROPOSED BY FHA

Recently the Federal Highway Administration proposed rules for the application of value engineering as listed in the Federal Register, Vol. 41, No. 249, December 27, 1976.

These proposed rules provide that value engineering will be performed on federal-aid projects and also provides for the employment of consultants to conduct value engineering studies. It is my opinion that if these rules are adopted it would increase the paper work requirements and would result in delays and increased cost with no actual benefit to the public.

I believe that most, if not all, highway departments practice value engineering throughout the entire process of planning, designing, and constructing highway facilities. The proposed rules would serve no good purpose.

## CONCLUSIONS

The application of value engineering under Missouri's *Cost Reduction Incentive Specification* appears to be a very useful tool and no serious problems have been encountered in the administration of this specification.

I would recommend it to any other state highway agency which might be considering some form of value engineering in the administration of highway construction contracts.

## APPENDIX

(Cost Reduction Incentive Specification—Missouri State Highway Department, October 1975)

### SECTION 104 SCOPE OF WORK

Add the following to Sec. 104.2.

104.2.6 Cost Reduction Incentive.

104.2.6.1 The contractor may submit to the engineer, in writing, proposals for modifying the plans, specifications or other requirements

of this contract for the sole purpose of reducing the total cost of construction. The modification proposed shall not impair, in any manner, the essential functions or characteristics of the project, including but not limited to service life, economy of operation, ease of maintenance, desired appearance, or design and safety standards.

Cost reduction proposals shall contain the following information:

- a. A description of both the existing contract requirements for performing the work and the proposed changes.
- b. An itemization of the contract requirements that must be changed if the proposal is adopted.
- c. A detailed estimate of the cost of performing the work under the existing contract and under the proposed change.
- d. A statement of the time within which the engineer must make a decision thereon.
- e. The contract items of work affected by the proposed changes, including any quantity variation attributable thereto.

104.2.6.2 Cost reduction proposals which propose changes in the basic design of a bridge or a pavement type will not be considered. The Commission will not be liable to the contractor for failure to accept or act upon any cost reduction proposal nor for any delays to the work attributable to any such proposal. If a cost reduction proposal is similar to a change in the plans or specifications under consideration by the Commission for the project at the time said proposal is submitted or if such a proposal is based upon or similar to Standard Specifications, Special Provisions, or Standard Drawings adopted by the Commission after the advertisement for the contract, the engineer will not accept such proposal, and the Commission reserves the right to make such changes without sharing the savings with the contractor.

104.2.6.3 The contractor shall continue to perform the work in accordance with the requirements of the contract until a change order incorporating the cost reduction proposal has been approved. If a change order has not been approved by the date upon which the contractor's cost reduction proposal specifies that a decision thereon should be made, or such other date as the contractor may subsequently have specified in writing, such cost reduction proposal shall be deemed rejected.

104.2.6.4 The engineer shall be the sole judge of the acceptability of a cost reduction proposal and of the estimated net savings in construction costs from the adoption of all or any part of such proposal. In determining the estimated net savings, the right is reserved to disregard the contract bid prices if, in the judgment of the engineer, such

prices do not represent a fair measure of the value of work to be performed or to be deleted.

104.2.6.5 The Commission reserves the right where it deems such action appropriate to require the contractor to share in the Commission's cost of investigating a cost reduction proposal submitted by the contractor as a condition for considering such proposal. Where such a condition is imposed the contractor shall indicate his acceptance thereof in writing, and such acceptance shall constitute full authority for the Commission to deduct amounts payable to the Commission from monies due or that may become due to the contractor under the contract.

104.2.6.6 All costs incurred by the Commission in evaluating the proposal will be deducted from the savings realized from approved cost reduction proposals without prior acceptance from the contractor. The resulting figure will constitute the net savings.

104.2.6.7 If the contractor's cost reduction proposal is accepted in whole or in part, such acceptance will be by a change order, which will specifically state that it is executed pursuant to Sec. 104.2.6. Such change order will incorporate the changes in the plans and specifications which are necessary to permit the cost reduction proposal or such part of it as has been accepted to be put into effect, and will include any conditions upon which the Commission's approval thereof is based if the approval of the Commission is conditional. The change order will also set forth the price for performing those items of work affected by the change order and the estimated net savings in the cost of performing the work attributable to the cost reduction proposal in the change order, and will further provide that the contractor be paid 50 percent of the actual net savings of the construction cost at the completion of the work affected by the change order.

104.2.6.8 Acceptance of the cost reduction proposal and performance of the work thereunder shall not extend the time of completion of the contract unless specifically provided for in the change order authorizing the use of the cost reduction proposal.

104.2.6.9 The amount specified to be paid to the contractor in the change order shall constitute full compensation to the contractor for the cost reduction proposal and the performance of the work in the change order.

104.2.6.10 The Commission expressly reserves the right to adopt a cost reduction proposal for general use on contracts administered by the Commission when it determines that said proposal is suitable for application to other contracts. When an accepted cost reduction proposal is adopted for general use, only the contractor who first submitted such

proposal will be eligible for compensation pursuant to this section and, in that case, only as to those contracts awarded to him prior to submission of the accepted cost reduction proposal. Cost reduction proposals identical or similar to previously submitted proposals will be eligible for consideration and compensation under the provisions of this section if the identical or similar previously submitted proposals were not adopted for general application to other contracts administered by the Commission. Subject to the provisions contained herein, the state or any other public agency shall have the right to use all or any part of any submitted cost reduction proposal without obligation or compensation of any kind to the contractor.