VALUE ENGINEERING (Part 1)

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DEFINITION

Value engineering is a method allowing a construction firm to propose changes in contract requirements which will "get the job done" at least as well as the original design but at a lower cost.

Under present economic conditions, bidding competitions is keen. It often results in our bidding a job on a narrow profit margin. Therefore, the possibility of increasing profits, after the contract award, is of great interest to the contractor. Value engineering affords the contractor this opportunity and also results in a savings to the governmental agency involved.

In theory we are speaking of a situation in which, through a change, the contractor is allowed to retain a percentage of the money which is saved, and the governmental agency also retains a percentage of the money which is saved. In practice the contractor realizes a larger profit (which he must do to stay in business), and the governmental agency involved receives a project equal to, or better, than it had proposed and at a lower cost. This again is important to government, especially in these times, when not enough tax money is available to provide all the services necessary.

AUTHORITY

Tri-City Construction Company has successfully completed "value" engineering projects with the U.S. Army Corps of Engineers at Fort Riley, Kansas, and the Missouri State Highway Department on the Route 50 highway bridge project.

The corps of engineers instituted value engineering in the job specifications for the Fort Riley project. These specifications read in part as follows.

Corps of Engineers

A. Application—This clause applies to a contractor development and documentation value engineering change proposal which:

(1) requires a change to this contract to implement the value engineering change proposal and (2) reduces the contract price without impairing essential function or characteristics, provided that it is not based solely on a change in deliverable end-item qualities.

B. Documentation—As a minimum, the following information shall be submitted by the contractor: (1) a description of the difference between the existing contract requirements and the proposed change, the comparative advantages and disadvantages of each, justification where function or characteristics of a work item are being altered, and the effect of the change on the performance of the end item; (2) an analysis and itemization of the requirements of the contract which must be changed if the value engineering change proposal (VECP) is accepted and a recommendation as to how to make each such change; (3) a separate detailed cost estimate for both the existing contract requirement and the proposed change to provide an estimate of the reduction in costs that will result, taking into account the costs of development and implementation by the contractor; (4) a prediction of any effect the proposed change would have on related costs to the military department, such as the cost of maintenance and operation; (5) a statement of the time by which a change order adopting the VECP must be issued so as to obtain the maximum cost reduction during the remainder of the contract; (6) identification of any previous submission of the VECP including dates submitted.

C. Sharing—If a VECP submitted by the contractor pursuant to this clause is accepted, the contract price shall be adjusted without regard to profit in accordance with the following provisions: (1) instant contract savings to the contractor are the estimated reduction in the contractors cost of performance resulting from the acceptance of the VECP; the proposed cost reduction includes estimated allowable contractor development and implementation costs—the contractor's development and implementation costs are those costs incurred after the contractor has identified a specific value engineering project and prior to acceptance and implementation by the government; (2) government costs are those costs which directly result from development and implementation, such as test and evaluation.

D. Calculations and actions—Multiply the contractors' savings by 45% and the government costs by 55%, add these two results and subtract from the contract price.

Missouri State Highway Department

Bill Shaw of the Missouri State Highway Department will describe the value engineering specifications of the Missouri State Highway Department.

CORPS OF ENGINEERS—FORT RILEY

Change in Building

The contract plans and specifications called for a 22-ft. 2-in by 50-ft. ½-in. by 12-ft. 11⅜-in. structural steel building to be built for a pump station, with factory or field insulated wall panels, having exterior and interior face panels and for the roof to be a 22-gauge galvanized steel deck with rigid insulation and a five-ply built-up roof. Many other design data were stated such as: snow load, wind loading, crane beam and runway, steel yield strength, and many others. Tri-City construction company proposed to construct a special all steel building design engineered and fabricated by Armco Steel Corporation especially to meet the requirements for this contract. The building consists of a main structural frame with welded plate rafters, beams, and exterior columns.

Dollar Savings

A certificate of compliance was submitted by a registered engineer of Armco Steel Corporation, certifying that the building complied with the specified design data. The cost savings was some 11% of the original building contract cost, of which the corps of engineers realized 45% of the savings and Tri-City realized 55% of the savings.

STATE OF MISSOURI—ROUTE 50 HIGHWAY BRIDGE

Change in Design

The contract plans and specifications called for the removal of a concrete bridge deck and for the bridge deck to be removed by thirds to allow traffic use of the remaining two-thirds of the bridge deck. The bridge was 850 ft. long with 14 spans. The middle three spans were supported by two built-up plate girders with transverse floor beams, while the remaining spans were shorter and supported by built-up plate girders. In the original design, additional structural members were added at the floor beam section to support the existing deck that was needed to maintain the traffic. Also, the reinforcing steel detail was such that tranverse bars were to be field spliced at the edge of each one-third of the deck.

Change of Traffic

The scheduled operation allowed workmen to remove and replace one-third of the deck while maintaining two-way traffic on the remaining bridge deck and had an estimated completion time of about two years. Tri-City Construction Company proposed to reroute traffic on an adjacent street and to close the structure to all traffic. In so doing, the construction time could be reduced from two years to one construction season, and the bridge closing would create a safer working condition for the workmen.

Dollar Savings

Contributing to money savings were: (1) the deletion of the temporary steel beams, (2) the redesign and faster placement of the reinforcing steel, and (3) the elimination of 1,610 lineal feet of longitudinal construction joints. Additional cost factors were the upgrading work necessary to the detour street prior to construction and the maintenance work necessary during the construction period. As a result of analysing all costs, a savings of $54,473 was realized, saving the state government of Missouri $27,236.

CONCLUSIONS

Value engineering is a relatively new concept that should not be confused with change orders or force account. Value engineering is a conceptual change to the contract, which in turn is identified in revisions to the plans and specifications. I believe that this process can bring together the best of two areas—namely the expertise of the governmental agency and construction experience of the contractor. The result is a savings to the tax payer.