Value Engineering

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Agenda

• References
• VE Defined
• VE and “Should Cost”
• VE over the life cycle
• VE Benefits
• Potential VE Applications
• VE Methodology
• Performing VE on Government Contracts
• Unrealized VE Opportunities
• Establishing a VE Program
Value Engineering: A definition

- **Value Engineering (VE):** VE is an organized/systematic approach that analyzes the functions of systems, equipment, facilities, services, and supplies to ensure they achieve their essential functions at the lowest life-cycle cost consistent with required performance, reliability, quality, and safety. Typically the implementation of the VE process *increases* performance, reliability, quality, safety, durability, effectiveness, or other desirable characteristics.

- VE also is sometimes referred to as Value management, Value analysis, and Value control.

- Required by USC and DoD policy:
  - 41 U.S.C 432 and FARs Part 48 and 52.248 requires that agencies shall establish and maintain cost-effective value engineering procedures and processes.
• Value Engineering (VE) comes in two flavors:

  – VECP. A contractor-initiated proposal where the savings are shared between the Government and the contractor. A VECP is submitted under the VE clause of a contract pursuant to Reference (f). It proposes a net life-cycle cost reduction to the DoD and requires a contract modification.

  – VEP. VEP is a Government-initiated, multidisciplinary product, usually the result of a team study. VEP may be developed and submitted by individual employees or contractors under contract to provide VE services or studies for a Government program. The Government retains all the savings from VEPs.
Value Engineering and “Should Cost”

• How are they similar?
• How are they different?
Should Cost Management

• All acquisition managers should *routinely analyze all cost elements* and look at reasonable measures to reduce them with prudent consideration of risks.

• Don’t accept the Independent Cost Estimate (ICE) as a self-fulfilling prophesy.

• The goal is **not** to spend the budget – it’s to get all the value for the budget.

• Requirements for Should Cost:
  – Should cost targets are required for all ACAT I-III (services and products) programs.
  – ACAT I PMs and PEOs report Should Cost progress during DAES and DAB reviews.
  – PMs’ performance evaluation should consider effective cost control including implementation of should cost.
Adopting Should-Cost Management in the Life-Cycle

- Should-Cost Management is a continuous process
  - A tool to manage costs across all phases, focusing on controlling costs of actual work being done
  - Used to incorporate efficiencies, lessons learned, and best practices of other programs to lower costs
  - Establish cost reduction targets based on deliberate initiatives.
  - May require investment upfront to achieve bigger savings in the future
  - Not all initiatives will be successful in achieving savings
• Value Engineering ≠ “Should Cost”
• Value Engineering is one of many ways to get to Should Cost
Value Engineering over the Life Cycle

Cost Reduction Potential

Cost to Implement

Materiel Solution Analysis
Materiel Development Decision
Initial Capabilities Document (ICD)

Technology Maturation & Risk Reduction
Materiel Development

Engineering & Manufacturing Development

Decision

FRP

Production & Deployment

Sustainment

Operations & Support

Disposal

LRIP

Development

PDR

CDR

CPD

ICD Draft

Model 1: Hardware Intensive Program
Initial Capabilities Document (ICD)
DRAFT CDD
Capability Development Document (CDD)
Capability Production Document (CPD)

IOC

FOC
"VE provides, and is based on, a shared value concept through incentives for the government, incentives for the contractor, and the equally shared incentive of providing the best possible warfighting capability and systems to the military within the context of a successful business relationship."
VE Benefits

• In past roughly 30 years, ROI ≈ 30 : 1
• $47B in cumulative savings
• Average Savings 2006-2011 $2.5B
• Savings reapplied within the program, command, or component to finance approved but previously unfunded requirements
VE Benefits

• VE targets:
  – cost reduction, communications, procedures, waste reduction, performance, efficiency, reliability, producibility, quality, effectiveness, readiness, warfighting capability, cycle time

• VE is a win – win for DOD and Contractor
Potential VE Applications

- Outdated specifications
- Obsolescence
- Packaging/Shipping
- Management/Overhead/Data Deliverables
- Diminishing Manufacturing Sources And Material Shortages (DMSMS)
- Systems, Equipment, Facilities, and Procedures all candidates for VE
VE Methodology aka “Job Plan”

- Divide the task being studied into functions
- Looking for Best Value
- Eight Phases
  1. **Orientation Phase**: Refine the problem statement and prepare for the value study.
  2. **Information Phase**: Finalize the scope of the issues to be addressed, targets for improvement, and evaluation factors while building cohesion among team members.
  3. **Function Analysis Phase**: Identify the most beneficial areas for study.
  4. **Creative Phase**: Develop a large number of ideas for alternative ways to perform each function selected for further study.
VE Methodology aka “Job Plan”

• Eight Phases

5. Evaluation Phase: Refine and select the best ideas for development into specific value-improvement recommendations.

6. Development Phase: Determine the “best” alternatives for presentation to the decision-maker.

7. Presentation Phase: Obtain a commitment to follow a course of action for initiating an alternative.

8. Implementation Phase: Obtain final approval of the proposal and facilitate its implementation.

• “People Problems” vs Technical Problems
VE Methodology aka “Job Plan”

• Success or failure can depend on
  – Contacts between members of the VE team and their sources of information,
  – Relations within the VE team, and
  – Contacts with persons who have the authority to approve or disapprove the changes recommended by the VE team.
Performing VE on Govt Contracts

• VE is in the FAR (Part 48)

• Two approaches
  – Voluntary using Incentives (VEI Clause)
    • Contractor funded and results in VECP
    • Savings are shared
    • Contractor allowable costs for development of the VECP paid if VECP approved by DOD
  – Mandatory using VE program requirement (VEPR) clause
    • DOD funded and results in VECP
    • Savings are shared but at lower rate than VEI Clause
Performing VE on Govt Contracts

- VEI Approach
Performing VE on Govt Contracts

- So what do I look for when my contractor submits a VECP?
  - Description of the difference between the existing contract requirement and the proposed requirement
  - Comparative advantages and disadvantages of each
  - Justification when an item’s function or characteristics are being altered
  - Effect of the change on the end item’s performance and any pertinent objective test data.
Performing VE on Govt Contracts

- So what do I look for when my contractor submits a VECP?
  - List and analysis of the contract requirements that must be changed if the VECP is accepted
  - Identification of the unit to which the VECP applies
  - Detailed cost estimate for (i) the affected portions of the existing contract requirement and (ii) the VECP
  - A description and estimate of costs the government may incur in implementing the VECP, such as test and evaluation and operating and support costs
Performing VE on Govt Contracts

• So what do I look for when my contractor submits a VECP?
  – A prediction of any effects the proposed change would have on collateral costs to the agency
  – A schedule impact analysis for maximum benefit of the VECP
  – An identification of previous submissions of the VECP
Performing VE on Govt Contracts

• So what happens with the savings?
  – Lump Sum Method
    • If you can predict with some degree of certainty the number of affected items to be procured within the share period
    • Then specify the anticipated future procurement quantity
    • The cost savings per unit are then multiplied by the anticipated share period quantity, and the instant contract* price is increased by the contractor’s share of that amount
Performing VE on Govt Contracts

• So what happens with the savings?
  – Future Savings Method
    • Contractor receives a portion of the per-unit savings that occur either as contracts incorporating the VECP are awarded or as VECP-affected units are delivered
  • Provisions for:
    – Multiyear contracts
    – LRIP contracts
    – New contracts during the share period
Performing VE on Govt Contracts

• So what happens with the savings?
  – “No-cost modification” method
    • Contractor keeps ALL savings from the instant contract* and its own concurrent contracts
    • Government keeps ALL savings from future contracts and concurrent contracts with OTHER sources plus collateral savings**

* The instant contract is the contract under which the VECP is submitted and accepted
** Collateral savings are those measurable net reductions in cost of operation, maintenance, logistics support, shipping, or Government Furnished Equipment that result from an accepted VECP
Unrealized VE Opportunities

- Diminishing Manufacturing Sources and Material Shortages (DMSMS) is defined as the loss or impending loss of manufacturers or suppliers of items or raw materials. DMSMS is a complex issue with at least three basic problems to be addressed:
  
  - **Technology improvements:** As new products are developed, the technology used in predecessor products becomes outdated, making it more difficult to maintain the older equipment.
  
  - **Decreasing demand:** The parts needed to repair products may become more difficult and expensive to acquire because fewer are produced as demand for them decreases.
  
  - **Non-availability of materials:** The materials required to manufacture products may no longer be available, or they may be expensive to procure.
Unrealized VE Opportunities

- Diminishing Manufacturing Sources and Material Shortages (DMSMS)

Navy Phalanx Example of VE Contributions to DMSMS

Using an Existing Substitute Approach

The Phalanx Close-In-Weapon-System is a fast-reaction, rapid-fire 20-millimeter gun system that provides Navy ships with a terminal defense against anti-ship missiles and fixed-wing aircraft that have penetrated other fleet defenses. It can also be used against small gunboats, standard and guided artillery, and helicopters. Phalanx uses advanced radar and computer technology to locate, identify, and direct a stream of armor-piercing projectiles to the target. A contract was awarded to retrofit Phalanx with a manual controller to direct fire against targets of opportunity.

Using the function analysis aspect of the VE methodology, the contractor identified an opportunity to replace a military standard fixed-hand controller (similar to a joy stick) with a derivative of a commercial unit, not built to military standards. On its own initiative, the contractor worked with the commercial source to produce a modified unit and tested the unit against the requirements for the military standard version. Based on the test results, the contractor had confidence that the commercial derivative would meet all of the technical requirements at a lower cost. Therefore the contractor submitted a VECP to replace the standard military controller with ruggedized commercial derivatives. The military standard controller would cost $7,600, while the commercial derivative was only $2,100. Since each gun required three controllers, the net savings would be $16,500 per system. Approximately $2 million in savings were shared by the Navy and the contractor. Eventually, the Navy may save more than $9 million if the idea is applied to all ships. In addition, the VECP provided for earlier implementation of the improved system.
Unrealized VE Opportunities

• Service Contracts

Table 2. Janitorial Service Contract Example Before VECP Changes

<table>
<thead>
<tr>
<th>Contract line item number (CLIN)</th>
<th>Requirement</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>Sweep 15,000 sq. ft. of office space daily, Mon–Fri, for the 5-year period Oct 1, 20XX–Sep 30, 20XX</td>
<td>1,200</td>
<td>Days</td>
<td>$60.00</td>
<td>$72,000</td>
</tr>
<tr>
<td>0002</td>
<td>Mop 15,000 sq. ft. of office space weekly for the 5-year period Oct 1, 20XX–Sep 30, 20XX</td>
<td>250</td>
<td>Weeks</td>
<td>$120.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>0003</td>
<td>Wax and polish 15,000 sq. ft. of office space monthly for the 5-year period Oct 1, 20XX–Sep 30, 20XX</td>
<td>60</td>
<td>Months</td>
<td>$240.00</td>
<td>$14,400</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>$116,400</td>
</tr>
</tbody>
</table>

Table 3. Janitorial Service Contract Example After VECP Changes

<table>
<thead>
<tr>
<th>CLIN</th>
<th>Requirement</th>
<th>Quantity</th>
<th>Unit</th>
<th>Rate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>0001</td>
<td>Purchase and install 15,000 sq. ft. (1,667 sq. yds.) of industrial strength carpeting</td>
<td>1,667</td>
<td>Sq. Yd.</td>
<td>$20.00</td>
<td>$33,340</td>
</tr>
<tr>
<td>0002</td>
<td>Vacuum 15,000 sq. ft. of office space weekly for the 5-year period Oct 1, 20XX–Sep 30, 20XX</td>
<td>250</td>
<td>Weeks</td>
<td>$120.00</td>
<td>$30,000</td>
</tr>
<tr>
<td>0003</td>
<td>Shampoo carpet twice yearly for a 5-year period Oct 1, 20XX–Sep 30, 20XX</td>
<td>10</td>
<td>Each</td>
<td>$300.00</td>
<td>$3,000</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td></td>
<td></td>
<td>$66,340</td>
</tr>
<tr>
<td></td>
<td>Net Savings ($116,400 – $66,340)</td>
<td></td>
<td></td>
<td></td>
<td>$50,060</td>
</tr>
</tbody>
</table>

Before: $116,400

After: $91,370
Establishing a VE Program

- Top Management Support CRUCIAL
- Written/Published Policy
- Goals and Objectives
- Designated VE Leader with access to top management
Establishing a VE Program

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Value Engineering benefits both DoD and Contractors!

- **Benefits to DoD**
  - Substantial savings to the DoD may be realized
  - Savings can be re-invested back into program for increased buys, unfunded requirements, etc.

- **Contractors benefit from:**
  - Increased profit resulting from VECP implementation
  - Improved communication with government, enhanced probability for future work
  - Application of technology to other products
Example of Application of Value Engineering

**Abrams 120mm Gun Tube Refurbishment**

**The Problem:** The U.S. Abrams tank program previously purchased new Profile Verification Program (PVP) 120mm gun tubes for Abrams vehicles at a very high cost, $108,351 each, when they were damaged or missing from vehicles.

**The Solution:** The solution was proposed claiming and salvaging Abrams 120mm gun tubes from the recent Iraq Foreign Military Sales and using these tubes to support M1A2V2 production drop out factor (DOF) and sustainment through FY13.

**The Results:** Cost avoidance of $9.98M over 3 years. 131 gun tubes were re-worked to meet specifications negating the purchasing of new gun tubes.
Summary

- Value Engineering can come from within the DOD (internal) or from without (contractor)
- Value Engineering applies across the life cycle
- Value Engineering savings can be shared with the contractor or redistributed within the program
- Value Engineering complements Should Cost and is NOT easy
- Lots of references and a DAU CLM (CLE 001)
Questions?

V/R

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