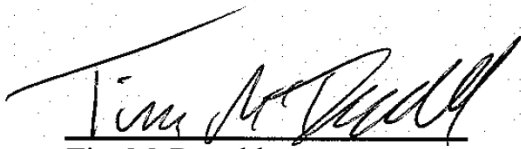


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DESIGN VALUE ENGINEERING STANDARD PROCEDURES

This document provides the procedural guidelines for the implementation of the Value Engineering (VE) Program during the Project Development Process (pre-construction). Value Engineering in Construction is governed by Policy 27-008(P) and Standard Procedure 510-008(SP). Value Engineering will occur on transportation improvement projects during preliminary engineering and early in the detailed design phases. The Value Engineering Studies will be conducted utilizing the Society of American Value Engineers (SAVE) Methodology. The Value Engineering criteria contained herein are based on the Federal Highway Administration's (FHWA) Title 49 Code of Federal Regulations

This standard procedure is applicable to Federal and State funded projects and replaces Policy 510-001(P) dated January 7, 1998. This standard procedure is issued under the direction of Policy 21-006(P), dated _____.

AUTHORITY:

23 U.S.C. 106(d), 106(f), 112(b), 302, 307, and 315; 23 CFR 627, 49 CFR 18

SOURCE:

62 FR 6868, February 14, 1997 (as amended at **67 FR 75924**, December 10, 2002), unless otherwise noted.

REFERENCES:

NHI Course No. 13405, Value Engineering for Highways; USDOT; FHWA: Publication No. FHWA-HI-88-047 and V.E. Study Workbook; Publication No. FHWA-HI-88-051. This Policy supersedes Policy No. 21-006(P).

Federal Highway Administration (FHWA) VE Page web site: www.fhwa.dot.gov/ve/index.htm

DEFINITIONS:

Basic Function: The needed performance characteristic(s) of a product or service which is required in order to make it perform.

Secondary Function: An additional performance characteristic of a product or service.

High Cost: Refers to usable project segments estimated to cost \$20 million or more for any project type and an estimated cost of \$18 million or more for standalone bridge projects. If the total cost of a standalone bridge project falls between \$18 to \$20 million, and \$20 to \$25 million for all other projects, the COVEC and the District will evaluate the project to determine if a VE study is warranted. The estimated project cost includes: preliminary engineering (PE), right of way (ROW), including utility reimbursement, detailed design, environmental, and construction costs.

Life Cycle Cost: Total cost of an item's ownership. This includes initial costs (planning, utilities, design, right-of-way, and construction), operation, maintenance, modification, replacement, demolition, financing, taxes, and disposal, as applicable.

Unnecessary Costs: Those costs which are not required for the performance of the necessary functions.

Value Engineering: The systematic application of recognized techniques by a multi-disciplined team, to identify the function of a product or service, establish a worth for that function, generate alternatives through the use of creative thinking, and provide the needed functions to accomplish the original purpose of the project, reliably, and at the lowest life-cycle cost without sacrificing safety, necessary quality, and environmental attributes of the project.

Central Office Value Engineering Coordinator (COVEC): Located in Central Office, establishes VE policy and procedures, oversees the value engineering program for ODOT and coordinates all VE studies, attends and participates in all VE studies, assures that VE recommendations are fully and fairly evaluated and accepted recommendations are implemented, gathers and analyzes data for annual reports to ODOT and FHWA, and has the capability to advocate and market the VE process and results.

Value Engineering Job Plan: The formal problem-solving procedure used to carry out a value engineering study. The VE job plan includes eight phases:

1. Selection
2. Investigation
3. Speculation
4. Evaluation
5. Development
6. Presentation
7. Implementation
8. Monitoring

Value Engineering Team: Usually five or more professionals aware of various aspects of the item being studied. For a highway study it could include engineers or others proficient in planning, environmental matters, design, right of way, utilities, construction, maintenance, and estimating.

PROCEDURE:

I. Value Engineering Target Project Selection

- A. It is the district's responsibility to review projects currently programmed in the planning/NEPA (preliminary engineering) stage, and/or detailed design phase to determine if any of the following criteria apply:
1. Total estimated cost in excess of \$20 million for any project type (preliminary engineering, construction, right of way, detailed design and environmental). If the total cost falls between \$20 to \$25 million, the COVEC and the District will evaluate the project to determine if a VE study is warranted.
 2. Total estimated cost in excess of \$18 million for any standalone bridge project (preliminary engineering, construction, right of way, detailed design and environmental). If the total cost of a standalone bridge project falls between \$18 to \$20 million, the COVEC and the District will evaluate the project to determine if a VE study is warranted.
 3. Current estimates substantially in excess of the initial cost estimates.
 4. Includes complex items.
 5. Contains items using scarce or expensive materials.
 6. Includes items which require difficult construction or fabrication procedures.
 7. Contains items which are used as the result of custom, tradition or opinion.
 8. Contains items that appear costly to build or maintain.
- B. The Project Development Process (PDP) manual details when a value engineering session should be held for a major or minor project that meets the aforementioned criteria. Under major projects of the PDP, Steps 6 and 8 illustrate the need for a VE session to occur as well as the required plan and cost documentation required to conduct an effective session. Each major project will not necessarily require two VE sessions. Under minor projects of the PDP, Steps 3 and 4 illustrate the need for a VE session to occur, and will require the same type of plan and cost documentation as required for major projects. Minor projects that qualify for value engineering may require only one VE session. The VE coordinator can always be contacted to clarify the need for specific plan and cost documentation required for all VE Sessions. Whether the project is classified as major or minor, the decision to conduct a second

- VE study during the detailed design phase will be a collaborative decision made by the District Production Administrator, the COVEC and FHWA”.
- C. The District Value Engineering Coordinator shall maintain a list of projects to be value engineered which shall include the potential time frames to conduct the VE sessions (both preliminary engineering and detailed design). This list shall forecast the upcoming two years. An updated list shall be submitted to the COVEC twice a year in January and July and whenever the district VE coordinator becomes aware of a change in the project schedule or scope that would affect the timing or necessity of the VE session. In order to facilitate tracking of value engineering sessions relative to overall project schedule, the VE session(s) should be included as a specific task in all project gantt charts.
 - D. Based on the districts’ list of potential projects, the COVEC compiles a statewide schedule of projects to be value engineered for the next two years. The COVEC will submit the statewide schedule to the district value engineering coordinators. If there are any problems with this schedule, the district value engineering coordinator will notify the COVEC within seven (7) calendar days. All data shall be updated and a final schedule shall be published by the COVEC within seven (7) calendar days.
 - E. As additional projects are programmed or entered into the detailed design phase, they are to be evaluated under the criteria above. If they are found to be candidates for value engineering, their development schedules shall include appropriate time for value engineering studies and related activities.
 - F. If a problem occurs necessitating a change in the date of the VE session, the COVEC shall be contacted immediately. At least three months are needed to make any necessary adjustments in the schedule.

II. Value Engineering Studies of Projects

- A. Each value engineering study shall be assigned to an individual study team. The team leader shall be either a Certified Value Specialist (CVS) recognized by the Society of American Value Engineers (SAVE) or an ODOT employee trained and knowledgeable in VE techniques and able to serve as the coordinator and facilitator of the team. The team shall have a minimum of five or more members including the leader. The intent is that value engineering study teams will be primarily composed of district personnel including the project manager, when feasible.

The district VE coordinator should notify the COVEC four (4) weeks prior to the VE study if central office personnel are needed. Individuals from the public and other

agencies may also be included on the team when their inclusion is found to be in the public interest. The team members shall collectively have expertise in the following areas:

1. The general subject area defining the project (i.e. bridges, pavement, roadway, environmental, drainage, geotechnical, traffic control, lighting, right-of-way, utilities, construction, maintenance, etc.). For highly specialized areas, it is appropriate to make arrangements to obtain the assistance of an expert in the field who is not an assigned team member but who will provide necessary advice and special analysis. The use of consultants, material suppliers or contractors may be appropriate if care is taken to assure that unfair bias is not introduced.
2. Knowledge of the practices and costs of construction, operation and maintenance of the project.

The team should not normally include persons involved with the day-to-day design of the project, with the exception of the district project manager. However, it is permissible to have a design member in attendance to provide support during the VE session. This individual will not be considered a team member.

- B. The team shall be provided a suitable room for the duration of the study (normally one week or less) and sufficient relief from normal duty assignments to allow at least eight hours per day during which the entire team is assembled. Ideally, the team would be able to meet daily for at least three days. If needed, the study could continue for a longer period as deemed necessary.
- C. The team shall be afforded access to all design information for the project at least two (2) weeks prior to the VE Session, which would include a set of plans, detailed cost analysis and any other pertinent information. Information contained in study documents should meet the requirements of Section 1400 of L&D Manual, Volume III for preliminary engineering and/or Stage 1 submittals. A computer and projector shall be provided for the team's use during the VE session for access to CADD files, the estimator, real estate acquisition and utility reimbursement information, bridge inspection reports, etc.
- D. A field review by the VE team should be conducted on complex projects at the discretion of the district project manager. The project manager will be responsible for leading the field review or delegating to an alternative resource.
- E. The team shall perform a value engineering study in conformance with the SAVE methodology. The study shall be documented in a value engineering report for each

project studied. The study shall include Life Cycle Cost Analysis (LCCA) as appropriate.

- F. On the first day of the VE session, the design team shall make a brief detailed presentation of the project to the value engineering team for informational purposes. The presentation should make use of audio-visual aids to give the team a more informative view of the project, its location, constraints, and any other pertinent information. The last day of the VE session shall include a presentation of the VE Alternatives/Recommendations to the design team and the District Planning & Programming Administrator and/or District Production Administrator, and the district project manager. This allows those not present during the value engineering session to receive a detailed explanation of the value engineering alternatives developed by the VE team. A draft VE report of the value engineering session will be completed by the VE facilitator and sent to the COVEC. The COVEC and the project manager, and one of the VE team members (or whomever the district decides) will review the draft report. All comments and corrections are to be directed to the COVEC for submittal to the VE facilitator for final editing and completion of the final VE report. A final VE report shall be distributed to the COVEC, FHWA, district project manager, design project manager, and all other pertinent personnel as deemed necessary by the COVEC and the project manager.
- G. After reviewing the final VE report, a Value Engineering Review Board meeting shall be held within forty-five (45) calendar days of the VE session. The forty-five (45) calendar day limit may be waived due to extenuating circumstances surrounding the project. The value engineering review board shall consist of:
- District Production Administrator
 - District Planning & Programming Administrator
 - Central Office Value Engineer Coordinator
 - FHWA VE Coordinator/Area Engineer (federal projects only)
 - District Construction Engineer (constructibility issues)
 - Project Design Team Leader
 - District Project Manager
 - Representative for any affected local agency (if necessary)
 - District VE Coordinator

Each individual listed above, or their representative, shall attend the presentation and be provided a copy of the written proposal. At the discretion of the District, other representatives may attend such as the District Deputy Director, major/new coordinator, environmentalist, right-of-way specialist, utilities coordinator, etc. Complete study documentation including workbooks, figures, computations, and visual aids shall be available for review.

- H. The Review Board, following discussion and consideration, will react to each recommendation in one of the following ways:
1. Accepted - Remanded to the District Planning & Programming Administrator, District Production Administrator or District Construction Engineer for implementation.
 2. Rejected - The Board shall offer detailed observations on the reasons for rejection. Rejection with no valid reason is unacceptable.
 3. Referred to the district for further analysis of one or more alternative(s) to help determine their disposition(s). In the event that the Board selects this action, they shall also establish a time to review the additional analysis.

A record of the review board meeting will be taken by the district value engineering coordinator using the "Summary of Potential Cost Savings" form provided by the COVEC, and forwarded to the COVEC within fourteen (14) calendar days from the date of the review board meeting. The record will include the disposition of all VE study proposals. If the proposals are not to be implemented, the record will identify the reasons why in detail.

- I. The District Project Manager shall initiate and monitor the activities necessary to implement the approved VE recommendations in accordance with the implementation plan developed as part of the VE report. The district Project Manager shall update the District Value Engineering Coordinator on the implementation progress as it occurs during project development activities. The district Value Engineering Coordinator shall serve as an information resource to the District Production Administrator as to the overall implementation of the VE recommendations.
- J. The district Project Manager shall provide a set of Stage 3 plans to the district VE coordinator who shall verify that all accepted VE recommendations have been incorporated into the plans. Afterwards, the district VE coordinator shall forward the Stage 3 plans to the COVEC to verify that all accepted VE recommendations were implemented.

III. Value Engineering Data Report

- A. At the conclusion of the Federal Fiscal Year (September 30), the COVEC shall prepare a summary of value engineering efforts for the FHWA in a format provided by FHWA. It may include the following information:

- Number of value engineering studies accomplished during the year.
- Number and estimated cost of projects associated with the value engineering studies completed during the year.
- Number and anticipated savings of recommendations made in the completed studies.
- Number and anticipated savings of recommendations approved for implementation in the completed studies.
- Summary of Value Engineering Change Proposals received from the Central Office Construction Value Engineer Coordinator

B. This annual report shall be provided to the following personnel:

Director of the Ohio Department of Transportation
Assistant Director of Planning & Production
Deputy Director of Production Management
Administrator of the Office of Production (Central Office)
Federal Highway Administration (VE Coordinator)

IV. Value Engineering Studies Not Related to a Project

A value engineering study may be performed on processes, specifications, standard drawings or operations as deemed necessary by the director, assistant director, or deputy director within one of the districts or central office.

V. Limitations of Value Engineering Recommendations

A. The use of geometrics and/or safety criteria which do not meet design standards is normally not acceptable.

B. Any proposals which would not meet current design standards will be considered only if:

- It can be shown the assumptions leading to the use of those design standards do not apply to the specific project in question.
- An analysis of the change, as compared to the standard requirement, shows no measurable loss of safety and indicates that overall cost savings will outweigh any sacrifices in operation and maintenance costs.

VI. Value Engineering Structure Within ODOT:

A. Central Office

1. A value engineering coordinator (COVEC) who shall:
 - a. Establish statewide VE schedule in accordance with Section I of this procedure.
 - b. Provide support to district value engineering coordinators (advice, referral of “experts,” scheduling, etc.).
 - c. Gather information and develop an annual value engineering report to ODOT management and to FHWA.
 - d. Encourage value engineering within ODOT and in conjunction with ODOT administered projects.
 - e. Review VE recommendations to ascertain various trends that may lend themselves to future changes in design standards.
 - f. Arrange facilities, plans, and other information required by the study. This would also include any support documents needed to be previewed by the VE team members. Coordinate with the district VE coordinator to verify the location of the value engineering session.
 - g. Arrange for one or more persons from the original design team (consultant staff, if appropriate) to work with the review team and answer questions, provide background and decision criteria utilized in the design, and provide additional information as needed (this will be done at the design team presentation portion of the VE session).

B. District Office

1. District value engineering coordinator: This will be an individual preferably in the District Production or Planning and Programming office with the following duties:

- a. Routinely screen all district programmed and planned projects to identify those requiring value engineering and which appear to be desirable value engineering study candidates. Maintain a list of these projects and submit to the COVEC in accordance with Section I of this procedure.
- b. Maintain contact with the project managers on the status of upcoming projects so they may be properly scheduled for a value engineering session. In addition, the project manager should contact the VE coordinator two (2) months prior to the VE session to verify the project schedule has not changed.
- c. In conjunction with the COVEC, select value engineering study teams and arrange for them to perform studies at appropriate stages within targeted projects. This will include:
 - (1) Contacting study team member's supervisors to arrange for the team member's time. The intent is that value engineering study teams will be primarily composed of district personnel. Notify the COVEC if central office personnel are needed.
 - (2) Notify the COVEC, if a location other than ODOT Central Office is desired for the value engineering session.
 - (3) Request the participation of experts (external) from the COVEC.
 - (4) Arrange for presentation facilities, support equipment and attendance by the district value engineering review board.
 - (5) Provide summaries of value engineering target lists, studies, recommendations, implementation, and acceptance for use by the COVEC.
 - (6) Report to the District Production Administrator, District Planning & Programming Administrator, and District Deputy Director on the successes, failures, future goals, and other pertinent aspects of the district's value engineering program.
- d. The district VE coordinator should coordinate with the district project manager in gathering information from the design consultant at least four (4) weeks ahead of the scheduled VE session for distribution to the VE team members. District VE coordinator should communicate with the project manager to verify the project is on schedule.

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- e. Verify that the distribution of information from the design consultant is in the hands of the team a minimum of two (2) weeks prior to the VE session.

TRAINING:

The Division of Production Management will provide training for District and Central Office personnel to implement the policy and procedures.

FISCAL ANALYSIS:

There are two primary cost areas for the application of Value Engineering during the design phase: the cost of the study which includes the VE Facilitator(s) and the costs of ODOT and Consultant staff participation. Typically, even if only a portion of the recommendations are implemented, the sum of the VE recommendations will be greater than the total cost of the VE Program.