

Approved:

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Responsible Office: Engineering Policy

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Director

## **VALUE ENGINEERING PROGRAM**

### **PURPOSE:**

This policy establishes a Value Engineering (VE) Program within the Department. Value Engineering is a systematic analysis, usually early in the design phases, of transportation improvement projects, plans and standards by multi-disciplined teams which identify the function of a project, establish a worth for that function, generate alternatives through the use of creative thinking and provide the needed functions at the lowest overall cost. Whenever possible, the lowest overall cost is defined in terms of life cycle cost techniques.

This policy also establishes Value Engineering incentives during the construction phase of a project. The Value Engineering incentive in construction allows the Contractor to submit Value Engineering Change Proposals which lower the project cost or offer a time savings in construction without impairing the essential functions and characteristics of the project. If the proposal is accepted by the Department, the Contractor and Department share equally in the cost savings.

### **AUTHORITY:**

1. 1995 NHS Legislation, Section 303, amends Section 106 of Title 23, Code of Federal Regulations (CFR).
2. Section 5525.01 of the Ohio Revised Code

### **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.

### **SCOPE:**

All Districts, Divisions and Offices of the Ohio Department of Transportation.

-or-

District Planning and Program Administration, District Production Administration, District Highway Management Administration, Central Office, Office of Structural Engineering, Office of Highway Management, Office of Materials Management, Office of Roadway Engineering, Office of Traffic Engineering, Office of Contracts, Office of Estimating, Office of Production, Office of Project Coordination, Office of Real Estate.

### **BACKGROUND:**

National Highway System Legislation enacted in late 1995 requires that Value Engineering Studies be applied to all NHS funded projects costing in excess of \$25 million. Value Engineering has been promoted by FHWA since 1975 but its use in most states has been limited. Those which have adopted it whole heartedly, such as California and Florida, have experienced a substantial return on their investments of as much as \$10 saved for each \$1 invested in the program.

The National Highway System legislation also states that usable project segments in excess of \$25 million require Life Cycle Cost Analysis (LCCA).

Life Cycle Cost Analysis (LCCA) is an element within the value engineering process, but it can also be applied outside the V.E. process. In either use, it can help to assure that the long term economic effect of various transportation improvement alternatives are well understood.

SB 287 passed by the Ohio General Assembly in 1996 to amend ORC Section 5525.01 allows the Contractor to submit Value Engineering Change Proposals which reduce the project cost or save time without impairing any of the essential functions or characteristics of the project. Many other state DOTs successfully use Value Engineering incentives in construction to achieve significant cost savings on construction projects. Value Engineering programs in Florida and New Jersey were benchmarked during the creation of the Value Engineering incentives in construction policy.

### **DEFINITIONS:**

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

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

Cost of Function: All costs directly associated with the performance of a particular function.

Function: Any performance characteristic that a product or service accomplishes.

High Cost: Refers to usable project segments estimated to cost \$25 million or more.

Life Cycle Cost: Total cost of an item's ownership. This includes initial acquisition costs (right-of-way, planning, design, 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.

Usable Project Segment: Refers to a portion of a highway to be constructed, reconstructed, or improved that, when completed, could be opened to traffic independent of some larger overall project. Such a "usable project segment" could be completed under a single contract or in multiple phases over several years.

Value Engineering: The systematic application of recognized techniques, by multi-disciplined team(s), which identifies the function of a product or service; establishes a worth for that basic function and for some secondary functions; and provides alternate ways to accomplish the necessary function, reliably, at the lowest overall cost of the function, through the use of creative techniques. Value Engineering is a method for solving cost and technical problems. Listed are several similar terms and their accepted uses. Each uses methodology similar to the V.E. Plan:

Value Administration: Based on the function analysis of individual (overhead) activities in an organization.

Value Analysis: Usually used when applying Value principles in other than an engineering environment to items already designed.

Value Assurance: Often indicates the application of Value Engineering during design or procedure preparation. Its objective is to assure a high-value item when released for manufacture or construction, or when placed in service.

Value Improvement: Refers to efforts applied to existing items to create one of better value.

Value Management: Sometimes called Value Control, VM recognizes that value principles are a management tool applicable to a variety of problems, only one of which is cost. It can also embrace all "cost awareness" programs. Value, like safety, is an accountable responsibility of management at all levels.

Value Engineering Job Plan: The formal problem-solving procedure used to carry out a Value Engineering Study. The V.E. Job Plan includes eight phases:

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

Value of Function: Maximum Value is achieved when a function is performed at minimum cost and still meets all the user's needs.

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, design, environmental matters, right-of-way, budget, and estimating.

Worth of Basic Function: An estimate of the least expensive way of performing a function, neglecting the actual application of that function.

## **POLICY AND PROCEDURE:**

### **I. Value Engineering Target Project Selection**

A. Review projects currently programmed and in the detailed design phase to determine if any of the following criteria apply.

1. Cost in excess of \$25 million.
2. Current estimates substantially in excess of the initial cost estimates.
3. Includes complex items which may provide costly functions.
4. Contains items using scarce or expensive materials.
5. Includes items which require difficult construction or fabrication procedures.
6. Contains items which are used as the result of custom, tradition or opinion.
7. Contains items that appear costly to build or maintain.
8. Designs which have grown very complex by being added to over a period of time.

B. Each District shall arrange projects meeting the criteria listed above into a Value Engineering Study priority list. Projects would be given a higher priority if they meet more than one of the criteria and/or if they greatly exceed any of the criteria. Priority may also take into account the project schedules and commitment dates. Where possible, however, projects showing a high priority shall have their schedules adjusted to permit at least one value engineering study. Projects in excess of \$25 million on the NHS, using federal funding must be subject to value engineering studies.

Additionally, usable project segments in excess of \$25 million on the NHS must be subjected to life cycle cost analysis.

- C. 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 high profile candidates for value engineering, their development schedules shall include appropriate time for value engineering studies and related activities.
- D. Each district shall perform value engineering studies on at least 5% of the number of projects filed in each year, excluding crack sealing, guardrail rebuilding, herbicidal spraying, mowing, pavement marking, raised pavement markers and signing projects.

## II. Value Engineering Studies of Projects

- A. Each value engineering study shall be assigned to an individual study team. The team leader shall be trained in value engineering. The team shall have five to seven members including the leader. The intent is that value engineering study teams will be primarily composed of District personnel. The team members shall collectively have expertise in the following areas:
  - 1. The general subject area defining the project (i.e. bridges, pavement, roadway, drainage, traffic control, lighting, 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 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 operation and maintenance of the project.

The team should not normally include persons involved with the design of the project or whose function it is to monitor and review the normal progress of the design of that project.

- B. The team shall be provided a suitable room for the duration of the study (normally one to two weeks) and sufficient relief from normal duty assignments to allow at least four hours per day during which the entire team is assembled. Ideally, the team would be able to meet daily for an entire week.
- C. The team shall be afforded access to all design information for the project including computer and CADD files.

- D. The team shall perform a value engineering study, in conformance with the procedures outlined in the FHWA Publication “Value Engineering for Highways”, 1992 Edition (NHI Course No. 13405) (Value Engineering Textbook). The study shall be documented in a Value Engineering Study Workbook from the same source. The study shall include Life Cycle Cost Analysis for all projects estimated at \$25 million and life cycle cost analysis shall be included in other V.E. studies as appropriate.
- E. The Study results and recommendations shall be presented to the District Value Engineering Review Board, consist of:
- District Deputy Director
  - District Production Administrator
  - Project Design Team Leader
  - Engineering representative for any affected local agency
  - District Value Engineering Coordinator

Each shall attend the presentation and be provided a copy of the written proposal. Complete study documentation including workbooks, figures, computations and visual aids shall be available for review.

- F. The Review Board, following discussion and consideration, will react to each proposal in one of the following ways:
1. Approved - Remanded to the District Production Administrator for implementation.
  2. Disapproved - No further action is required, but the Board shall offer observations on the reasons for disapproval.
  3. Referred to the study team for further specific analysis to overcome a defect or oversight in the report.
  4. Referred to the District Production Administrator for specific analysis of a portion of the proposal to help verify claims or test features.

In the event that the Board selects action “c” or “d”, they shall also establish a time to review the additional analysis.

The Review Board may also offer general findings relating to the study team’s membership, study procedures, proposals and presentation, and these shall be included in the Value Engineering Study record for the project.

- G. The District Value Engineering Coordinator and the study team shall monitor the activities to implement approved recommendations in accordance with the implementation plan developed as a part of the value engineering report. The study team shall serve as an information resource to the District Production Administrator in implementing recommendations.
- H. At such time as plans are completed and Plan Package Submittals are forwarded from Districts to Central Office for sale, the appropriate section of the Plan Package Submittal form shall be marked to indicate the VE or LCCA studies performed.
- I. At the conclusion of each calendar year, the District Value Engineering Coordinator shall prepare a summary of value engineering efforts including the following information:
- Copy of value engineering priority target list at the beginning of the year.
  - 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 other value engineering issues considered during the year.
  - Recommendations for future value engineering program directions.

The District's annual value engineering report shall be provided to the following persons by March 31 of the following year.

- District Deputy Director
- Central Office Value Engineering Coordinator

At the conclusion of each year, the Central Office Value Engineering Coordinator shall compile a summary of Department-wide value engineering activities, including all of the information described in Section 7 above. This annual report shall be provided to the following persons by June 1:

Assistant Director of Business Management  
Assistant Director of Field Operations  
Assistant Director of Transportation Policy  
Chief Quality Officer

III. Value Engineering Studies Not Related to a Project

- A. Non-project value engineering studies shall be chosen by the Central Office Value Engineering Coordinator (COVEC) based upon input from District and Central Office managers. These will generally encompass studies of standard drawings and specifications.
- B. Value engineering study teams will be selected by the COVEC and will include central office or district staff persons normally assigned to deal with the standard or specification under consideration. They shall represent the points of view of design, construction, operation and maintenance. Contractors or material suppliers may be requested to provide information to value engineering study teams as well as representatives of other city, county or state agencies.
- C. Non-project study teams will consist of five to seven members including a trained team leader.
- D. The teams will be provided a suitable area for their use and have access to pertinent records, and necessary equipment or clerical assistance.
- E. Each value engineering study team shall accomplish a value engineering study in general accord with the FHWA Publication "Value Engineering for Highways", 1992 Edition (NHI Course No. 13405) (Value Engineering Textbook). The study shall be documented in a Value Engineering Study Workbook from the same source.
- F. The study results and recommendations shall be presented to a Value Engineering Review Board consisting of:
  - The Administrator(s) of each office which deals with the standard drawing or specification section involved. One technical specialist from each office may also attend.
  - The COVEC.
  - The Deputy Director of Engineering Policy.

Each shall attend the presentation and be provided a copy of the written proposals and supporting information. Complete study documentation including workbooks, figures, computations, data and visual aids shall be available for review.

- G. The Review Board, following discussion and consideration will react to each proposal in one of the following ways:

1. Recommended for implementation; turned over to the appropriate office administrator(s) for implementation.
2. Disapproved - No further action is required, but the review board shall offer observations on the reasons for approval.
3. Referred back to the study team for further specified analysis to overcome a minor defect or oversight in the recommendation.
4. Referred to the appropriate office administrator(s) for specified analysis in order to verify claims to test features.

In the event the Board selects actions “c” or “d”, they shall also establish a time to review the additional analysis.

The Review Board may also offer general findings relating to the study team membership, study procedures, proposals and presentation and these shall be included in the value engineering study record for the project.

- H. The COVEC and the study team shall monitor activities to implement approved recommendations in accordance with the implementation plan developed as a part of the value engineering report. The study team shall serve as an information recourse to the office administrator implementing the recommendations. In the event the office administrator later determines that a recommendation cannot be implemented, the administrator shall provide documentation of the reasons to the COVEC.
- I. The COVEC shall summarize the non-project value engineering studies in the annual report to management. This shall include progress achieved in implementing all past non-project recommendations accepted.

#### IV. Limitations of Value Engineering Recommendations

- A. The use of geometrics and/or safety criteria which are below 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 instant case.
  - 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.

V. Value Engineering Structure Within ODOT Shall Consist of the Following:

A. Central Office

1. A Value Engineering Coordinator (full-time) who shall:
  - a. Provide support to District Value Engineering Coordinators (training, advice, referral of “experts”).
  - b. Gather information and develop an annual value engineering report to ODOT management and to FHWA.
  - c. Oversee value engineering studies of ODOT standard drawings, specifications, etc.
  - d. Encourage value engineering within ODOT and in conjunction with ODOT administered projects.
2. A Value Engineering Technical Assistant (part-time) (future position) who shall:
  - a. Assist in the gathering and analysis of data for annual and special value engineering reports.
  - b. Assist with arrangement for value engineering studies and maintain listings of value engineering sources (such as value engineering specialists and technical experts).
3. An office support person (part-time) who shall:
  - a. Provide word processing service to aid in value engineering studies, training correspondence, reports and related activities.
  - b. Maintain a value engineering file, records and archive.

B. District Office

1. District Value Engineering Coordinator. This will be a part-time (most Districts) engineering position in the District Production office with the

following duties:

- a. Screen all District programmed and planned projects to identify those requiring value engineering (per FHWA rules) and which appear to be desirable value engineering study candidates.
- b. 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.
  - (2) Arrange facilities, plans, and other information required by the study.
  - (3) Arrange for one or more persons from the original design team (or 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.
  - (4) Request the participation of experts from Central Office on study teams.
  - (5) Arrange for presentation facilities, support equipment and attendance by the District Value Engineering Review Board.
  - (6) Provide summaries of value engineering target lists, studies, recommendations, implementation, and acceptance for use by the COVEC.
  - (7) Report to the District Production Administrator and District Deputy Director on the successes, failures, future goals and other pertinent aspects of the District's value engineering program.

## VI. Value Engineering Incentive in Construction

### A. Intent and Objective

1. When a contract contains a special provision allowing the submission of a value engineering proposal, the Contractor who has been awarded a contract may submit a Value Engineering Change Proposal (VECP). The VECP must

reduce the cost of a project or, when the provision specifically allows time savings, reduce the duration of the project or the duration of a specific portion of the project. The purpose of a VECP is to amend the contract documents in order to receive a lower project cost or a time savings. A Value Engineering Change Proposal must be identified as such when it is submitted by the Contractor to the Department.

2. VECPs must result in savings of time and/or money as determined by the Department without impairing the essential functions and characteristics of a project. Essential functions and characteristics include service life, reliability, economy of operation, ease of maintenance, safety, and necessary standardized features and any engineering commitment such as environmental mitigation measures both during and following construction. However, nothing herein prohibits the submittal of VECPs where the required functions and characteristics could be combined, reduced or eliminated as nonessential or excessive. Plan errors which are identified by the Contractor and included in a VECP as part of cost reduction will not be considered by the Department when determining the sufficiency of the VECP. A VECP which consists only of non-performing an item of work contained in the plans will not be considered by the Department.
3. The Department reserves the right to reject at its discretion any VECP submitted. The Department will not approve VECPs that change any of the following:
  - a. Special architectural aesthetic treatments of structures.
  - b. The design and thickness of cast-in-place concrete decks.
  - c. The design of bridges with respect to the roadway geometrics.
  - d. The design of overhead sign supports and breakaway sign supports.
  - e. The type of noise barriers.
4. The Department will not approve a time savings VECP for any project which has an Incentive / Disincentive clause or which was awarded based on A plus B Bidding or Lane Rental. A VECP which saves money on these types of projects will be considered.
5. The Department reserves the right to reject a VECP which requires additional right of way. Substitution of another design alternate, which is detailed in the plans, for the one on which the Contractor bid, is not allowed under this provision. A VECP which includes changes to bridges and structures shall

conform to the current AASHTO Standard Specifications for Highway Bridges as modified by the ODOT Bridge Design Manual. Pending execution of a change order or extra work change order implementing an accepted VECP, the Contractor is obligated to perform in accordance with the terms and conditions of the existing contract.

6. No contract time extensions will be granted due to the time required by ODOT to review a VECP.

#### B. Subcontractors

The Contractor is encouraged to include this provision in its contracts with subcontractors; however, it is not mandatory that VECPs be submitted nor is it mandatory that the Contractor accept or transmit to the Department VECPs proposed by his subcontractors. The Department will accept VECPs from the prime Contractor only.

#### C. Submittal of Initial Proposal

A written initial proposal stating that the proposal is a VECP proposal is required for each VECP and shall outline the general technical concepts associated with the proposal and the total estimated cost savings which will result. The initial proposal will be reviewed by the Department and, if found to be conceptually acceptable, approval to submit a final proposal will be granted by the Department. The Department will generally respond to initial proposals within 7 calendar days. A finding of conceptual acceptability of the initial proposal shall not obligate the Department to approve the final proposal. The contractor shall have no claim against the State as a result of the rejection of any such final proposal. Three (3) written copies of the initial proposal shall be submitted: one to the Engineer, one to the District Value Engineering Coordinator and one to the District Construction Engineer. The initial proposal must be properly identified as a value engineering proposal.

#### D. Submittal of Final Proposal

Final proposals will be considered only after Department approval of the initial proposal in accordance with item VI.C. above. As a minimum, the following information shall be submitted by the Contractor with each VECP plus any additional information requested by the Department:

1. A statement that the final proposal is submitted as a VECP in accordance with established ODOT guidelines.

2. A description of the difference between the existing contract requirement and the proposed change, and the comparative advantages and disadvantages of each including considerations of service life, reliability, economy of operation, ease of maintenance, safety and necessary standardized features.
3. Separate detailed cost estimates for both the existing contract requirements and the proposed change. The cost estimates shall be broken down by contract item numbers indicating quantity increases or decreases and deleted pay items. Additional proposed work, not covered by contract items, shall be identified by current Department pay item numbers. In preparing the estimates, the Contractor shall include overhead and profit. No separate pay items are allowed for these costs.
4. An estimate of the effects the VECP would have on life cycle costs to the Department including, but not limited to, operational and maintenance costs.
5. Complete plans, specifications and calculations showing the proposed revisions in sufficient detail to identify and describe specific features of the contract which must be changed if the VECP is accepted. The proposal must show how these changes can be accomplished with an assessment of their impact on other project elements. If the VECP involves a design change, the design of the proposed changes shall be performed by a consulting engineering firm prequalified by ODOT in the applicable class of design work. If the VECP involves a specification change or non-roadway or non-structural design change (e.g. maintenance of traffic change), the use of a pre-qualified designer is not required. All plans and engineering calculations shall bear the signature of and be sealed by a Professional Engineer registered in the State of Ohio.
6. A specific date by which Departmental approval of the VECP must be issued to obtain the total estimated cost reduction during the remainder of the Contract, noting any effect on the contract completion time or delivery schedule. The date must be selected to allow the Department ample time, usually a minimum of 15 calendar days, or as mutually agreed to by the parties, for review and processing of the VECP and change order or extra work change order. The Department may require up to 60 days for extremely complex VECP submittals. Should the Department find that insufficient time is available for review and processing, it may reject the VECP solely on that basis. If the Department responds by rejecting the proposal, the Contractor shall consider the final proposal rejected and shall have no claim against the Department as a result thereof.

7. A description of previous use or testing of the VECP on another Department project or elsewhere and the conditions and results therewith. If the VECP was previously submitted on another Department project, indicate the date, the project and the action taken by the Department. If previously submitted elsewhere, provide a contact name and telephone number.

E. Conditions

Proposals will be considered only after award of the contract and only when all of the following conditions are met:

1. The VECP submittal must be made by the prime Contractor. The Contractor is cautioned not to base any bid prices on the anticipated approval of a VECP proposal and to recognize that such a proposal may be rejected. In the event of a rejection, the Contractor is required to complete the project in accordance with the plans, specifications and bid prices.
2. All VECP proposals, whether approved or not approved by the Department for use in the contract, apply only to the contract or contracts referenced in the proposal. All VECP proposals shall become the property of the Department and shall contain no restrictions imposed by the contractor on their use or disclosure. The Department will have the right to use, duplicate, and disclose in whole or in part any data necessary for the utilization of the proposal. The Department retains the right to use any accepted VECP or part thereof on any other or subsequent project without any obligation to the contractor. This provision is not intended to deny rights provided by law with respect to patented materials or processes.
3. If the Department already has under consideration certain revisions to the contract which are subsequently incorporated into a VECP proposal, the Department will reject the Contractor's proposal and may proceed with such revisions without any obligations to the contractor.
4. The contractor shall have no claim against the Department for any costs or delays due to the Department's rejection of a VECP, including but not limited to developments costs, anticipated profits or increased materials or labor costs resulting from delays in the review of such a proposal.
5. The Engineer will determine whether a VECP proposal qualifies for consideration and evaluation. The Engineer may reject any VECP that requires

excessive time and/or costs for review, evaluation and/or investigations, or which is not consistent with the Department's design policies and basic design criteria for the project.

6. The Engineer may reject all or any portion of Work performed pursuant to an approved VECP if the Engineer determines that unacceptable work is resulting. The Engineer may direct the removal of such rejected work and require the contractor to proceed in accordance with the original contract requirements without any reimbursement for any work performed under the VECP, or for its removal. Where modifications to the VECP are approved in order to adjust to field or other conditions, reimbursement is limited to the total amount payable for the work at the contract prices as if it were constructed in accordance with the original contract requirements. Such rejection or limitation of reimbursement does not constitute the basis of any claim against the State for delay or for any other costs.
7. The VECP shall not be experimental in nature but shall have been proven to the Department's satisfaction either under similar conditions on another Department project or at another location acceptable to the Department.
8. VECPs will be considered only if equivalent options are not already provided in the contract documents.
9. The VECP shall be based on items on work scheduled to be done by the contractor. Anticipated cost savings based on revisions of utility relocations or other similar items to be done by other non-contract parties will not be considered. Proposals which may increase the cost of work to be done by others will not be considered.
10. The savings generated by the VECP must be of sufficient significance to warrant review and processing. The Engineer will be the judge in determining sufficient significance.
11. If additional information is needed by the Department to evaluate a VECP, this information must be provided in a timely manner, otherwise the proposal will be rejected. Such additional information could include, where design changes are proposed, results of field investigations and surveys, design computations and field change sheets.

#### F. Processing Procedures

1. Five (5) copies of each final VECP (six (6) if the project is on the National Highway System (NHS)) shall be submitted as detailed in the VECP Guidelines: one to the Engineer, or his duly authorized representative, one to the District Value Engineering Coordinator, one to the District Construction Engineer, one to the central office Office of Estimating, and one to the Department's Value Engineering Office (plus one to the FHWA, if the project is on the NHS). VECPs will be processed expeditiously. However, the Department will not be liable for any delay in acting upon a VECP submitted pursuant to this Subarticle as stated in section VI.D.6. The Contractor may withdraw, in whole or in part, a VECP not approved by the Department within the period specified in the VECP. The Department shall not be liable for any VECP development cost in the case where a VECP is rejected or withdrawn
2. The Department shall be the sole judge of the acceptability of a VECP and of the estimated net savings in construction costs or time from the adoption of all or any part of such proposal. In determining the estimated net savings from a VECP, the Department reserves the right to consider other factors in addition to the contract bid prices and proposed unit prices if, in the judgment of the Department, such prices do not represent a fair measure of the value of the work to be deleted from or added to the contract.
3. Prior to approval, the Department may modify a VECP with the written concurrence of the Contractor in order to make it acceptable. If a modification increases or decreases the net savings resulting from the VECP, the Contractor's fair share will be determined upon the basis of the VECP as modified and upon determination of final quantities. The net savings shall be computed by subtracting the revised total cost of all bid items affected by the VECP design from the total cost of the same bid items as represented in the original contract.
4. When materials or processes not covered by specifications are proposed by the VECP, the proposal shall include complete material and process controls and past performance documentation to ensure the performance described in the VECP. In the event that additional test equipment is required to ensure compliance with those specifications, such equipment, properly calibrated, shall be provided, at no cost, for the use of ODOT Construction project personnel for the duration of the project. Instruction in the use of this equipment, by the manufacturer shall also be provided at no cost to the Department.
5. Upon acceptance of a VECP, any restrictions imposed by the contractor, subcontractors or suppliers on the use or disclosure of information submitted

shall be void. The Department shall thereafter have the right to use, duplicate and disclose in whole or in part any data necessary for utilization of the VECP on this project or other department projects.

6. For projects with Federal oversight required or for VECPs involving proprietary items on Federal-aid projects, the concurrence of FHWA on the accepted VECP is required.

#### G. Submittal of Final Plan Sheets

1. After acceptance of the final VECP by the Department and prior to the initiation of the change order approval process which constitutes the Director's approval of the VECP, the Contractor shall be notified to provide revised contract plan sheets showing all details consistent with the accepted VECP design. Failure of the Contractor to provide acceptable contract plan sheets within 10 calendar days after such request shall result in rejection of the entire VECP and the Contractor shall have no claim against the Department.
2. The plan sheets shall be submitted in accordance with current versions of the ODOT Location & Design Manual, Volume III and the ODOT Bridge Design Manual. If the VECP involves design changes, the design of the proposed changes shall be performed by a consulting engineering firm prequalified by ODOT in the applicable class of design work. All plans and engineering calculations shall bear the signature of and be sealed by a Professional Engineer registered in the State of Ohio.

#### H. Computations for Change in Contract Cost of Performance

Contract development and implementation costs for the VECP shall not be recoverable. If the VECP is adopted, the Contractor's share of the net savings as defined hereinafter shall be considered full compensation to the Contractor for the VECP.

#### I. Sharing Arrangements

1. When a VECP is approved by the Department, the Contractor shall be entitled to share in construction savings to the full extent provided for in this Subarticle. Any changes in collateral or life cycle costs to the Department shall not be considered in the determination of the estimated costs savings and are specifically excluded.
2. The Contractor and Department shall each receive 50 percent of net reduction in the cost of performance of this Contract.

3. The Contractor shall not receive construction savings on optional work listed in this Contract until the Department exercises its option to require that work.

J. Computations for Time Savings

1. When the bid documents contain a note specifically allowing for the receipt of a VECP which will save the Department contract time, the Contractor may propose a VECP which reduces the completion time for the entire project or for a project portion which has an interim completion date. The total value of a calendar day of time on the project or portion of a project is defined as the cost of the time savings incurred by ODOT. The cost of time savings to ODOT will be the amount of the daily liquidated damages as set forth in Section 108.07 of the current Construction and Material Specifications or a contract provision which establishes a daily liquidated damages amount. The Contractor and Department will each receive 50 percent of net savings in the value of time for the Contract calculated using the number of calendar days less than the original project completion date (or revised completion date if revised based on factors unrelated to the VECP) or interim completion date or time specified in the contract and using the total value of time as described in this Subarticle. Any other methods of valuing time, including road user costs, are specifically excluded.
2. In the event that the Department accepts a final VECP based on both time savings and a change in material or specification that results in a lower cost to the project, the Department will process the change order for the material or specification changes, division of time savings and the agreed upon change in completion date only after receipt of the acceptable plan sheets described in VI.H above. However, any payments due the Contractor for the time savings will be held until the completion of the project or a specific portion referenced in the VECP in order to verify that the time savings actually occurred. If the entire time savings is achieved, the Department will then initiate payment of the final time-savings portion of the VECP change order. If only a portion of the time savings is achieved and the project is completed before the original completion date, the Department will deduct from the time savings portion of the VECP change order payment for the number of days exceeding the revised completion date. If the project is completed after the original completion date (or revised completion date if revised based on factors unrelated to the VECP), the Department will deduct the entire time savings payment from the approved VECP and will assess liquidated damages for each day that the actual completion exceeds the original completion date (or revised completion date if revised based on factors unrelated to the VECP).

3. In the event that the Department accepts a final VECP based on time savings only, the completion date will be changed by change order. However, any payments due the Contractor for the time savings will be held until the completion of the project or the specific portion referenced in the VECP. If the entire time savings is achieved, the Department will then initiate payment of the final time savings share due the Contractor. If only a portion of the time savings is achieved and the project is completed before the original completion date (or revised completion date if revised based on factors unrelated to the VECP), the Department will deduct from the time savings portion of the VECP change order payment for the number of days exceeding the revised completion date. If the project is completed after the original completion date (or revised completion date if revised based on factors unrelated to the VECP), the Department will deduct the entire time savings payment from the approved VECP and will assess liquidated damages for each day that the actual completion exceeds the original completion date (or revised completion date if revised based on factors unrelated to the VECP).

#### **TRAINING:**

Proper application of Value Engineering and Life Cycle Cost Analysis Techniques requires a substantial investment in training. As a minimum, team leaders or facilitators shall have served on at least two previous V.E. Study Teams and have taken the 32 hour Value Engineering FHWA/NHI course or its equivalent led by an instructor who is a Certified Value Specialist CVS and also a professional engineer. Additionally, at least three persons on each V.E. study team should have received the same training. Training will be provided by Central Office based on course availability and funding. At such time as the Department has a CVS on staff, this person may lead internal training sessions similar to the FHWA course.

To the extent possible, training sessions shall use actual ODOT projects and standards as their focus, with the output of the V. E. Study teams channeled into the normal V.E. evaluation and approval process described in Sections II, E through G and III F through G as described above. When personnel are proposed for V.E. training, their supervisor in conjunction with the District or Central Office V.E. Coordinator as appropriate, shall recommend a specific project or standard for V.E. study during the course.

Since it may not be possible to complete the chosen V.E. study during the class time, the teams shall continue their activities leading up to a valid V.E. study presentation. Supervisors shall afford reasonable amounts of time to team members to accomplish this.

#### **FISCAL ANALYSIS:**

There are two primary cost areas for the application of Value Engineering during the design phase:

training costs and study costs. The cost of training is based on the salary cost of a typical class of 40 persons plus the cost of the presenters and a nominal fee if a non-ODOT meeting room is used. To offset the cost of training, however, actual ODOT projects are analyzed during the training so that the result of the training course is a list of VE recommendations for each project that was value engineered during the course. Typically, even if only a portion of the recommendations is implemented, the sum of the VE recommendations will be many times, perhaps a hundred or more, greater than the total cost of the training.

For study efforts outside of the training environment, the cost is that of a week's salary for 5-7 individuals, most of them engineers. The typical project subject to VE can be assumed to have about 10% savings as a result of the VE effort. Again, the sum of the VE savings will be many times greater than the cost of the study. Value Engineering offers an excellent return on the investment in the cost of the study.

Value Engineering Change Proposals have no initial cost for the Department since the proposal originates with the Contractor. If the Department feels that the savings from the proposal do not justify the cost to review and process the proposal, the VECP will simply be rejected. The savings from accepted VECPs will be shared equally with the Contractor, allowing each party to benefit from the proposal. Because the Department is the decision maker on which VECPs are accepted and has input on the agreed upon savings, value engineering in construction also offer an excellent return on the investment in review costs.