GOVERNMENT OF THE PHILIPPINES

RECOMMENDATIONS ON VALUE ENGINEERING IMPLEMENTATION IN THE PHILIPPINES

REPORT BY
JUAN CLAUDIO DEVINCENTI, CVS
FOR THE WORLD BANK MANILA

MANILA, JUNE 21, 2004

CAS INTERAMERICA 5403 WANETA Rd BETHESDA MD 20816 USA casinteramerica@verizon.net 301-229-0351

I. INTRODUCTION

The Terms of Reference for an international expert on Value Engineering, in an assignment by The World Bank, aim a) to provide information on international experience with value engineering analysis, and b) to advise the GPPB on how this might be applied to infrastructure projects in the Philippines

In order to accomplish these objectives it was decided to organize a series of 3 briefings and a two-day mini-study applying, in a very limited scale, the techniques of VE.

A. Briefings at The World Bank

Three briefings were scheduled on June 14, 15 and 18, 2004, at the The World Bank office, and with the participation of COA, DBM, DENR, DND, DOF, DOH, DOST, DOTC, DPWH, DTI, GPPB-TSO, NEDA, NIA and OP officials.

During these briefings the basic methodology of VE analysis was demonstrated, indicating the different approaches towards its implementation in countries like the United States, Argentina, Costa Rica and Chile.

VE is an excellent tool to identify unnecessary costs in a project. Different reasons why unnecessary costs occur were explained, but it was felt from the audience that corruption is an important factor and that VE analysis could contribute to diminish it.

The average implemented Value Engineering savings in international projects ranges from five to ten percent and higher. Historically, the return on investment (ROI) in VE studies ranges from 10:1 and up to well on 30:1.

That is thirty pesos saved for every peso invested in the Philippines in a VE study.

Several samples of international VE studies on infrastructure projects were shown. Projects ranged from highways to bus garages, airports and hospitals to housing, with original design costs ranging from US$12 million to US$ 26 million, and savings in the order of 8% to 18%.

For instance, in the case of route 127 in Argentina, just the use of a new material -geogrids- not known then in that country, represented a savings of over US$3 million on a US$54 million project. Total accepted VE study savings 18.42%. See Annex VI.

In another case, the hospital of Alajuela, in Costa Rica, benefited from a new computer program that identifies the best location of a building in a site by calculating cuts and fills for every position. Savings reached over US$1 million in a US$18 million project. Total accepted VE study savings 23.7%.

The use of the procurement system in the USA was introduced, where an amendment to the procurement law establishes the obligation to use VE in all government agencies. Copy of this law was distributed, see Annex III.

At the end of the briefings enthusiastic discussions were held clarifying the concepts and the application of VE in the Philippines.

B. Mini-Study at DPWH

At a meeting with authorities of DPWH it was decided to have a trial by taking a look to a project already designed, the By-Pass to the city of Cabanatuan.

This two-day exercise on the application of VE to a local highway project, was carried out at DPWH offices during June 10 and 11, 2004, with a VE team composed of DPWH professional personnel.

Sharing the VE Team was a representative of the design firm, who appreciated the advantages of having a VE study with the project.

Although the VE team had never been exposed to this discipline before, under the direction of an expert Team Leader was able to identify potential savings in the order of PP200 millions. See Annex V.

This seems to indicate that a more formal VE study, to develop in a total time of 2 weeks, could render substantial savings on this project.

II. CONCLUSIONS AND RECOMMENDATIONS

A. Conclusions.

As a result of the activities developed during these two weeks, it appears evident the interest and convenience of applying VE analysis to all government capital investment projects, in order to reduce costs.

The response of the audiences during the three seminars and the easiness with what the Mini-Study was conducted, as well as its results, confirm this asseveration.

At this moment there are several infrastructure projects in the pipeline, offering opportunities for a fruitful VE analysis work.

B. Recommendations

Therefore, the principal recommendation of this report is to commence with a series of case studies, to demonstrate the advantage of its application, before embedding it into the normal decision making process.

An added benefit to the savings generated by these VE studies -they should cover their expenses 10:1- is to add 6 professionals per study with hands on experience in VE.

The action suggested by this report now is shown in the following order of implementation:

1. To demonstrate the **validity of the VE concept** through the development of **three VE case studies**;

   These case studies, consisting basically of three two-week VE studies will analyze local projects.

   Execution:

   a. Contract one Certified Value Specialist, CVS, or other VE internationally certified professional, for 2 weeks at every project,

in order to conduct a VE study leading a VE team of up to six (6) professionals.

b. Contract up to (6) professionals to conform the VE Team, for 2 weeks per every VE study; they can be either/or from government staff or private practice. Their professional background should be related to the VE project assignment. See Terms of Reference for the VE Team and the professional VE Leader in Annexes I and II.

2. At a latter stage, once the goodness of the VE analysis is demonstrated, it should be an effort to review options in order to incorporate VE in the mainstream of Philippine legal structure

Our experience in the United States, after many unfruitful efforts in the Congress, was to introduce this requirement as an amendment to the procurement law.

As a reference, a copy of Public Law 104-106, passed in 1996, and also of Circular A-131, from the Office of Management and Budget, are attached to this report as Annex III.

Other alternatives are:

a. Every Department issuing its own regulations,

b. Adding VE clauses in construction bids,

c. Incorporating in every design competition the services of Value Engineering,

d. VE in the private sector at design-build biddings,

The use of some of these alternatives may require establishing a VE Program. Guidelines on how to organize and operate such program are presented in Annex IV.

GOVERNMENT OF THE PHILIPPINES

RECOMMENDATIONS ON VALUE ENGINEERING IMPLEMENTATION IN THE PHILIPPINES

ANNEX

I - TERMS OF REFERENCE VE STUDY
II - TERMS OF REFERENCE VE TEAM LEADER
III - LAWS, POLICY AND GUIDANCE
IV - THE VE PROGRAM
V - SUGGESTIONS FROM A 2-DAY MINI-WORKSHOP
VI - BRIEFING GUIDELINES

BY JUAN CLAUDIO DEVINCENTI, CVS
FOR THE WORLD BANK MANILA

MANILA, JUNE 21, 2004

CAS INTERAMERICA 5403 WANETA Rd BETHESDA MD 20816 USA casinteramerica@verizon.net 301-229-0351

Annex I - TERMS OF REFERENCE FOR VE STUDIES

I. Background

Value Engineering, VE, also known as Value Analysis, Value Management, is an organized effort directed to analyze the function of a project goods and services, with the objective of obtaining the necessary functions at a minimum cost, maintaining the essential characteristics of the project. This activity is consequent with the present policies of rationalization and maximum efficiency in capital investments of the Government of the Philippines.

With this end in mind, it has been a manifested interest in the preparation of VE studies in order to identify alternatives that represent lower construction, operation and maintenance costs of projects to build. The following described services intent to support this effort.

II. Objective

The objective of the services to provide by the Value Engineering Team, VET, will be:

1. To identify, qualify and quantify functional alternatives to present projects that represent cost reductions and lower operation and maintenance expenses during the life cycle of the projects.

III. Scope of work

The VE study will consist of a study to be executed by a multidisciplinary VET of minimum six professionals. The VET will follow the five-step job plan, internationally recognized by SAVE, the Society of American Value Engineers. The VE report must cover all the recommendations from the VET, with cost estimates, life cycle analysis and graphs, as needed for a clear and concise presentation.

These VE studies must be executed at the best possible opportunity, preferable at the feasibility phase of design, concurrent with the normal design revision processing by the Department and without causing delays in the project preparation schedule.

With this objective, and in reference to the mentioned project, the VET under the direction of a VET Leader will:

1. Review plans, reports and all material available related to the project, in reference to concepts of planning, design, materials and labor, construction techniques and other relevant characteristics.

2. Review the construction costs for the job, based on the data derived from the design for all line items.

3. Advise, using VE techniques, on the identification and evaluation of alternatives to the principal job components and prepare a cost estimate identifying respective potential savings.

4. List recommendations about feasibility, efficiency and opportunity of the alternatives identified in the previous item.

5. Present to the consideration of the authorities a draft of a VE final report after 8 working days of starting its work, to be reviewed, approved and implemented.

6. Prepare final report incorporating draft comments, after 10 working days of starting its work.

7. In the conduction of this work, the Leader of the VET will work in close collaboration with the assigned professional personnel.

IV. Composition of the VE Team under the VE Team Leader

The VE team will be selected comprising the following professional personnel:

a. Leader of the VET.
b. Between five and seven professionals -from the public or private sector- specialized on the topic of the project to be evaluated
c. Cost estimator
d. Secretarial support

V. Background of the Team Leader

Each team for a VE study must have a leader, who will be responsible of conducting the revision of the assigned project within the established procedures for the practice of VE.

The team leader will have a formal VE education and will be certified as CVS, Certified Value Specialist, by SAVE International, the Society of American Value Engineers, or an equivalent organization recognized by SAVE International.

Being experience a very important factor in the development of VE, the leader will have a minimum of ten (10) years of practicing VE.

VI. Final product

As a final product the Leader of the VET will present a report with findings and recommendations to improve and/or reduce the costs of the project.

The report to present will have the following information:

a. Table of contents

b. Brief description of the final project evaluated and of the requirements of the project.

c. Summary of the VE recommendations

d. A summary sheet with cost estimates at the current stage of design.

e. VE Cost model

f. Functional Analysis System Technique evaluation, or FAST diagram.

g. Each recommendation will be presented and described as:

   i. "before and after" the VE study,

   ii. it will carry a cost estimate of the savings achieved,

   iii. a discussion on the advantages and disadvantages of the VE idea, and its impact on the evaluated function,

   iv. a technical justification of the developed VE idea,

v. life cycle analysis when appropriate, and

vi. sketches when needed.

vii. all other supporting material.

h. The report will have the following format:

i. it will be systematically organized,

ii. it will be short and concise, but with enough information for decision making,

iii. the document will be in letter size, printed on one side for easy reproduction,

iv. pages are to be sequentially numbered.

Annex II - TERMS OF REFERENCE FOR VE TEAM LEADER

I. Background

Value Engineering, VE, also known as Value Analysis, Value Management, is an organized effort directed to analyze the function of a project goods and services, with the objective of obtaining the necessary functions at a minimum cost, maintaining the essential characteristics of the project. This activity is consequent with the present policies of rationalization and maximum efficiency in capital investments of the Government of the Philippines.

With this end in mind, the Government has manifested interest in the preparation of VE studies in order to identify alternatives that represent lower construction, operation and maintenance costs of projects to build. The following described services intent to support this effort.

II. Objective

The objective of the services to provide by the Value Engineering Team Leader, will be:

1. Lead the VE Team to identify, qualify and quantify functional alternatives to present projects that represent cost reductions and lower operation and maintenance expenses during the life cycle of the projects.

III. Scope of work

The VE Team leader will direct the study to be executed by a multidisciplinary VET of minimum six professionals. The VE Team leader will follow the five-step job plan, internationally recognized by SAVE, the Society of American Value Engineers. The VE Team leader will prepare a report which must cover all the recommendations from the VET, with cost estimates, life cycle analysis and graphs, as needed for a clear and concise presentation.

These VE studies must be executed at the best possible opportunity, without causing delays in the project preparation schedule.

With this objective, the VET Leader will:

1. Direct the VET to review plans, reports and all material available related to the project, for concepts of planning, design, materials and labor, construction techniques and other relevant characteristics.

2. Review with the VET the construction costs as derived from available data, and prepare a Construction Cost Model.

3. Direct the VET functional analysis of alternatives to the principal job components and review respective potential savings, using the technique of FAST (Functional Analysis System Technique) diagramming.

4. List recommendations about feasibility, efficiency and opportunity of the alternatives identified in the previous item.

5. Present to the consideration of the authorities a draft of a VE final report after 15 days of starting its work, to be reviewed, approved and implemented.

6. Prepare final report incorporating draft comments.

7. In the conduction of this work, the Leader of the VET will work in close collaboration with the assigned professional personnel.

IV. Composition of the VE Team under the VE Team Leader

The VE team will be selected comprising the following professional personnel:

a. Leader of the VET.
b. Between five and seven professionals -from the government or the private sector- specialized in the topic of the project to be evaluated.
c. Cost estimator.
d. Secretarial support.

V. Background of the Team Leader

Each team for a VE study must have a leader, who will be responsible of conducting the revision of the assigned project within the established procedures for the practice of VE.

The team leader will have a formal VE education and will be certified as CVS, Certified Value Specialist, by SAVE International, the Society of American Value Engineers, or an equivalent organization recognized by SAVE International.

Being experience a very important factor in the development of VE, the leader will have a minimum of ten (10) years of practicing VE.

VI. Final product

As a final product the Leader of the VET will present a report with findings and recommendations to improve and/or reduce the costs of the project.

The report to present will have the following information:

a. Table of contents

b. Brief description of the final project evaluated and of the requirements of the project.

c. Summary of the VE recommendations

d. A summary sheet with cost estimates at the current stage of design.

e. VE Cost model

f. Functional Analysis System Technique analysis, or FAST diagram.

g. Each recommendation will be presented and described as:

   i. "before and after" the VE study,

   ii. it will carry a cost estimate of the savings achieved,

   iii. a discussion on the advantages and disadvantages of the VE idea, indicating its impact on the evaluated function.

   iv. a technical justification of the developed VE idea, elaborating on the functional concept.

v. life cycle analysis when appropriate.

vi. sketches when needed, and

vii. all other supporting material.

h. The report will have the following format:

i. it will be systematically organized,

ii. it will be short and concise, but with enough information for decision making,

iii. the document will be in letter size, printed on one side for easy reproduction,

iv. pages are to be sequentially numbered.

Annex III - LAWS AND POLICIES

Laws, Policy and Guidance

INDEX:

I. PUBLIC LAWS

PUBLIC LAW 104-106--FEB. 10, 1996

SEC.4306. Value Engineering for Federal Agencies.

(a) Use of Value Engineering--The Office of Federal Procurement Policy Act
(41 U.S.C. 401 et seq.), as amended by section 4203, is further amended by
adding at the end the following new section:

SEC.36.VALUE ENGINEERING.

"(a) IN GENERAL.--Each executive agency shall establish and maintain cost-effective value engineering procedures and processes.

"(b) DEFINITION.--As used in this section, the term 'value engineering' means an analysis of the functions of a program, project, system, product,
item of equipment, building, facility, service, or supply of an executive
agency, performed by qualified agency or contractor personnel, directed at
improving performance, reliability, quality, safety, and life cycle costs."

PUBLIC LAW 99-662--NOV. 17, 1986

SEC. 911. During the design of each water resources project which has a

total cost in excess of $10,000,000, which is authorized before, on or after the date of enactment of this Act and undertaken by the Secretary, and on which construction has not been initiated as of the date of enactment of this Act, the Secretary shall require a review of the cost effectiveness of such design. The review shall employ cost control techniques which will ensure that such project is designed in the most cost-effective way for the life of the project.

Conference Report dated October 17, 1986, from the Water Resources Development Act of 1986, the following is excerpted:

"Section 911 is adapted from both the Senate and House bills and will require a new cost-cutting review on all projects with a total cost in excess of $10 million. Although not specified in the Conference Report, the
type of study to be undertaken is commonly known as value engineering."

II. OMB CIRCULAR NO. A-131, dated May 1993, SUBJECT: Value Engineering

This Circular requires Federal Departments and Agencies to use value engineering (VE) as a management tool ... to reduce program and acquisition
costs. The following excerpted paragraph outlines agency responsibilities:

8. Agency Responsibilities To ensure that systemic VE improvements are achieved, agencies shall, at a minimum:

a. Designate a senior management official to monitor and coordinate agency
VE efforts.

b. Develop criteria and guidelines for both in-house personnel and contractors to identify programs/projects with the most potential to yield
savings from the application of VE techniques. The criteria and guidelines
should recognize that the potential savings are greatest during the planning, design, and other early phases of
project/program/system/product
development. Agency guidelines will include:

(1) Measuring the net life-cycle cost savings from value engineering. The
net life-cycle cost savings from value engineering is determined by subcontracting the Government's cost of performing the value engineering function over the life of the program from the value of the total savings
generated by the value engineering function.

(2) Dollar amount thresholds for projects/programs requiring the application of VE. The minimum threshold for agency projects and programs which require the application of VE is $1 million. Lower thresholds may be established at agency discretion for projects having a major impact on agency operations.

(3) Criteria for granting waivers to the requirement to conduct VE studies,
in accordance with the FAR 48.201(a).

(4) Guidance to ensure that the application of VE to construction

projects/programs and other projects/programs, will include consideration of environmentally-sound and energy efficient considerations to arrive at environmentally-sound and energy efficient results.

c. Assign responsibility to the senior management official designated pursuant to section 8a. above, to grant waivers of the requirement to conduct VE studies on certain programs and projects. This responsibility may be delegated to other appropriate officials.

d. Provide training in VE techniques to agency staff responsible for coordinating and monitoring VE efforts and for staff responsible for developing, reviewing, analyzing, and carrying out VE proposals, change proposals, and evaluations.

e. Ensure that funds necessary for conducting agency VE efforts are included in annual budget requests to OMB.

f. Maintain files on projects/programs/systems/products that meet agency criteria for requiring the use of VE techniques. Documentation should include reasons for granting waivers of VE studies on projects/programs which met agency criteria. Reasons for not implementing recommendations made in VE proposals should also be documented.

g. Adhere to the acquisition requirements of the FAR, including the use of VE clauses set forth in Parts 48 and 52.

h. Develop annual plans for using VE in the agency. At a minimum, the plans should identify both the in-house and contractor projects, programs, systems, products, etc., to which VE techniques will be applied in the next fiscal, and the estimated costs of these projects. These projects should be listed by category, as required in the agency's report to OMB. VEP's and VECP's should be included under the appropriate category. Annual plans will be made available for OMB review upon request.

i. Report annually to OMB on VE activities as outlined in OMB Circular A-131, para.9.

III. HQUSACE VE POLICY

A. HQUSACE CIVIL WORKS PROGRAM VALUE ENGINEERING POLICY

1. References:

a. The National Defense Authorization Act for Fiscal Year 1996, which amended the Office of Federal Procurement Policy Act to require that each executive agency establish and maintain Value Engineering.

b. Lieutenant General Williams' memorandum, dated 23 DEC 94, Subject: U.S. Army Corps of Engineers Value Engineering (VE) Program, which requested that commanders support the VE Program.

c. Lieutenant General Williams' memorandum dated 18 AUG 94, Subject: Value Engineering Change Proposals (VECP) which requested MSC to take steps to ensure that Districts actively encourage contractors to participate in the VECP program.

d. Lieutenant General Williams' memorandum dated 10 Dec 93, Subject: U.S. Army Corps of Engineers Value Engineering Program, which endorsed the 1993 Office of Management and Budget (OMB) Circular A-131, and ER 5-7-1 dated 30 Sept 92.

2. A formal VE study (defined as a team study) shall be performed on all construction projects with current working estimate (CWE) of $2,000,000 and greater and on supply, service and operation & maintenance projects with CWE exceeding $1,000,000. Exceptions to this requirement must be approved by the division commander. These waivers should be limited to projects which duplicate another on which a VE Study has been performed, and on which the resultant cost is comparable to private industry. A list of approved exceptions will be sent to CEMP-EV quarterly. Construction projects with CWE less than $2,000,000 should be studied, when cost effective. You are reminded that Public Law requires a VE study to be performed on all Civil Works projects with CWE of $10,000,000 and greater.

3. All Corps of Engineers customers and sponsors are to be offered Value

Engineering services along with the opportunity to directly participate as
part of the Value Engineering team. This promotes a partnering relationship
and is an excellent source of additional information for study enhancement.
All navigation projects (including operation & maintenance) which fall within the limits specified in paragraph 2 above, will have formal VE studies performed, and will include local Waterway-Users Board representatives as members of the VE team.

4. Value Engineering is a command emphasis program, with progress to be reported to the Chief at quarterly command management reviews. Therefore,
the Value Engineering Officer (VEO) should have direct access to the Commander, regardless of physical location in the division or district office. Multiple responsibilities must be limited to ensure that division
VEO properly monitor district VE performance, and that district VEO professionally execute the Value Engineering Program. Proper selection of
qualified VEO's is paramount to program success, and in high workload districts, the VEO may need a supporting staff. New Value Engineering Officers should immediately attend the Corps 40-hour VE Workshop.

5. Each division VEO should schedule semiannual district staff visits to review VE activities and suggest corrective actions, when needed. Regional
Value Engineering Conferences may be substituted for one of these staff visits. Copies of division VEO Staff Visit Reports shall be included in the
4th Quarter VE Reports and should reflect the required visits to each district. (Note: Any division VEO who has not submitted FY 95 Staff Visit
Reports should comply).

6. The OMB Circular A-131 required audit is being performed to validate the
accuracy of agency reported Value Engineering savings and to assess the adequacy of agency implementation of its circular. This audit should be completed by summer, 1996 for the Corps. Divisions and districts must ensure studies are performed and reviewed in a professional manner. Past audits have commented on the lack of documentation for rejection of completed VE studies. Documentation will include the technical reasons for rejection and the name of the individual making the decision. Reasons such as "adequate project funds available," or "user rejected," are not satisfactory. All VE studies and VECP shall receive the same level of technical and management review as any other design or

technical modification. Rejections of any individual VE proposals with potential savings of $1 million or more and rejections on multiple proposals whose potential savings in the aggregate is $1 million or more must be approved by the division commander. Proposed rejections will be sent to the MSC Commander immediately (within 2 weeks) after the District review of the VE study.

7. The Value Engineering Change Proposal (VECP) Program needs additional emphasis. This program has historically produced less than 10 percent of the total Value Engineering Savings. However, proper emphasis can increase
project quality and result in savings greater than the total cost of the USACE VE effort. Contractors should be offered a copy of EP 11-1-4, dated 15 May 1995, encouraged to utilize the VE contract clauses, and assured that proposals will be given a fair review.

8. All Value Engineering studies shall be completed on the Value Engineering Report Template (VERT) and the Value Engineering Data Information System (VEDIS) as a part of the study documentation. Completed reports will be submitted electronically or via floppy disk to Kansas City District for incorporation into the National Institute of Building Sciences (NIBS) Construction Criteria Base CD Rom for access by all Corps Value Engineering Officers, project managers and contractors.

9. Engineering Form 4607-R must continue to be completed for each VE study
until VEDIS and VERT are fully utilized. A copy of this form will be retained with district files and the original sent to the division office.
Where VE savings exceed $250,000 or the study has USACE-wide interest, a copy will also be furnished to CEMP-EV at HQUSACE.

10. Value Engineering savings shall only be reported through the Value Engineering Program (Army Ideas for Excellence savings are reported separately, and VEO should ensure that no double reporting occurs). All VEO
shall validate/ensure that accepted value engineering proposals are included in the final design before claiming savings.

11. USACE 40-hour VE workshop training is considered the foundation for a
strong VE program and offers 3.2 Continuing Education Units (CEU) for students. The high CEU should help professional engineers & architects in
professional recertification. VEO should annually update their list of trained and non-trained personnel. Any Corps employee whose expertise or position has potential to assist in VE success should receive training. A

minimum of 15 percent of all eligible, untrained personnel should attend the 40-hour workshop annually. These personnel should be reminded annually
(during February/March) to schedule the Huntsville Prospect VE Course.

B. HQUSACE MILITARY PROGRAMS VALUE ENGINEERING POLICY

1. References:

a. The National Defense Authorization Act for Fiscal Year 1996, which amended the Office of Federal Procurement Policy Act to require that each
executive agency establish and maintain Value Engineering.

b. Lieutenant General William's memorandum, dated 23 DEC 94, Subject: U.S.
Army Corps of Engineers Value Engineering Program, which requested that commanders support the VE Program.

c. Lieutenant General Williams' memorandum, dated 23 DEC 94, Subject: U.S.
Army Corps of Engineers Value Engineering (VE) Program, which requested that commanders support the VE Program.

d. Lieutenant General William's memorandum, dated 10 DEC 93, subject: U.S.
Army Corps of Engineers Value Engineering Program, which endorsed the 1993
Office of Management and Budget (OMB) Circular A-131, and ER 5-7-1 dated 30
Sept 92.

2. A formal VE study (defined as a team study) shall be performed on all construction projects with current working estimate (CWE) of $2,000,000 and
greater, and on supply, service and operation & maintenance projects with
CWE exceeding $1,000,000. Projects based on standard designs will receive a
full VE study, and projects to be constructed by request for proposal (RFP)
type contracts will be subject to a VE study on the required criteria package prior to request issuance. Exceptions to this requirement must be
approved by the division commander. These waivers should be limited to

projects which duplicate another on which a VE Study has been performed, and on which the resultant cost is comparable to private industry. A list of approved exceptions will be sent to CEMP-EV quarterly. Construction projects with CWE less than $2,000,000 should be studied, when cost effective. You are reminded that Defense Environmental Restoration Program (DERP) projects are subject to OMB VE requirements, and their VE studies are being tracked in Command Management Review as a performance indicator.

3. VE is an integral part of the design cycle and will be applied early (normally at completion of 35% or concept design). Where the parametric procedure is used, a study will be provided after completion of approximately 10% of the design (after a detailed cost estimate is available). This detailed cost estimate is necessary to properly perform a
study and satisfy the OMB mandate.

4. All Corps of Engineers customers are to be offered Value Engineering services along with the opportunity to directly participate as part of the
Value Engineering team. This promotes a partnering relationship and is an
excellent source of additional information for study enhancement.

5. Value Engineering is a command emphasis program, with progress to be reported to the Chief at quarterly command management reviews. Therefore,
the Value Engineering Officer (VEO) should have direct access to the Commander regardless of physical location in the division or district office. Multiple responsibilities must be limited to ensure that the division VEO properly monitors district VE performance and that the district VEO professionally executes the Value Engineering Program. Proper selection of a qualified VEO is paramount to program success, and in high workload districts, the VEO may need a supporting staff. New Value Engineering Officers should immediately attend the Corps 40-hour VE Workshop.

6. Each division VEO should schedule semiannual district staff visits to review VE activities and suggest corrective action, when needed. Regional
Value Engineering Conferences may be substituted for one of these staff visits. Copies of division VEO Staff Visit Reports shall be included in the
4th Quarter VE Reports and should reflect the required visits to each district. (Note: Any division VEO who has not submitted FY 95 Staff Visit
Reports should comply).

7. The OMB Circular A-131 required audit is being performed to validate the accuracy of agency reported Value Engineering savings and to assess the adequacy of agency implementation of its circular. This audit should be completed by Summer 1996 for the Corps Program. Divisions and districts must ensure studies are performed and reviewed in a professional manner. Past audits have commented on the lack of documentation for rejection of completed VE studies. Documentation will include the technical reasons for rejection and the name of the individual making the decision. Reasons such as "adequate project funds available," or "user rejected," are not satisfactory. All VE studies and VECP shall receive the same level of technical and management review as any other design or technical modification. Rejections of any individual VE proposals with potential savings of $1 million or more and rejections on multiple proposals whose potential savings in the aggregate is $1 million or more must be approved by the division commander. Proposed rejections will be sent to the MSC Commander immediately (within 2 weeks) after the District review of the VE study.

8. The Value Engineering Change Proposal (VECP) Program needs additional emphasis. This program has historically produced less than 10 percent of the total Value Engineering Savings. However, proper emphasis can increase project quality and result in savings greater than the total cost of the USACE VE effort. Contractors should be offered a copy of EP 11-1-4, dated 15 May 1995, encouraged to utilize the VE contract clauses, and assured that proposals will be given a fair review.

9. All Value Engineering studies shall be completed on the Value Engineering Report Template (VERT) and the Value Engineering Data Information System (VEDIS) as a part of the study documentation. Completed reports will be submitted electronically or via floppy disk to Kansas City District (CEMRK-VE) for incorporation into the National Institute of Building Sciences (NIBS) Construction Criteria Base CD Rom for access by all Corps Value Engineering Officers, project managers and contractors.

10. Engineering Form 4607-R must continue to be completed for each VE study until VERT/VEDIS are fully operational. A copy of this form will be retained with district files and the original sent to the division office. Where VE savings exceed $250,000 or the study has USACE-wide interest, a copy will also be furnished to CEMP-EV at HQUSACE.

11. Value Engineering savings shall only be reported through the Value Engineering Program (Army Ideas for Excellence savings are reported separately, and VEO should ensure that no double reporting occurs). All VEO
shall validate/ensure that accepted value engineering proposals are included in the final design before claiming savings.

12. USACE 40-hour VE workshop training is considered the foundation for a
strong VE program and offers 3.2 Continuing Education Units (CEU) for students. The high CEU should help in professional recertification. VEO should annually update their lists of trained and non-trained personnel. Any Corps employee whose expertise or position has potential to assist in VE success should receive training.

Annex IV - PROGRAM TO IMPLEMENT VE ANALYSIS IN A GOVERNMENT AGENCY

A. General considerations

1. Purpose and Application

The purpose of the VE program is to improve the quality and productivity of projects, promote technical innovations, delete design elements that are costly and unnecessary, requiring the application of VE in the design of selected projects.

The Value Engineering Program will define minimum requirements and provide leadership to establish, manage and control the program.

The Program should be able to exclude certain projects -such as those financed with funds for planning, research and development, certain emergency projects, and others- from the phase of project selection for VE studies.

2. Definitions

a. Function.

Function is the purpose or use of a system or thing.

b. Life cycle cost.

The total cost of an item computed during its useful life. This includes the initial capital costs (highway right of way, planning, design, construction), plus the costs of operation, maintenance, modifications, replacements, demolition, financing, taxes and disposition associated with the project during its life cycle.

c. Value Engineering

Value Engineering is a professionally applied, function oriented, creative and systematic team approach, used to analyze and improve value in construction – a powerful methodology for solving

problems and/or reducing costs while improving performance and quality requirements.

d. The job plan

An organized plan of action to complete a VE study, dividing the study in different phases. The plan recognized for most agencies includes five to seven steps.

e. Value

An estimate of the most economic way to comply with a function, independent of its application to the project.

B. Program procedures for VE Studies.

The VE Program will include procedures to assure that the VE process be actively applied.

The VE procedures will require the identification of those projects candidates for VE studies at the beginning of the development of the annual investment program.

The VE program will establish specific criteria and guidelines for the selection of projects to be VE evaluated. Special consideration must be given to those projects that have:

a. recently shown substantial cost increases;

b. complex designs or construction phases;

c. large structures;

d. specifications, standards or processes particularly unique or experimental;

e. repetitive elements;

f. high land values;

g. high maintenance costs;

The VE Program may allow some projects not to be considered for VE analysis when the possibilities for improvement and/or savings are very low.

The VE studies must follow a systematic process to resolve problems, such as the Job Plan for VE. The VE studies must be carried out by a consistent team of expert professionals in the different disciplines that relate to the project to be evaluated.

The procedures to establish in the VE program will respond to the following general criteria:

1. The studies can be carried out any time in the design process, but is preferable at the feasibility level (35% completion), in order to be able to implement valid VE recommendations without delaying the project.

2. Each study must finish with a formal report defining the functional options and recommendations of the VE team to improve the project and reduce its total cost.

   As part of the report's formal process, there will a presentation of the recommendations from the VE team to the client of the VE study, and the documents of this presentation should be included in the final report.

3. The VE program will also include procedures to assure that an adequate documentation is kept of:

   a. the accepted -as well as the rejected- recommendations;

   b. the projected or actual savings associated with the recommendations;

   c. the total costs involved in the realization of the VE studies.

4. VE Coordinators

   The Program will have adequate personnel - professionals trained in VE- to effectively coordinate and control the VE effort.

   The professional coordinators assigned to manage and control the VE program, will have sufficient authority to assure the implementation of the program, and to be actively involved in all the phases of the study, including the development of a VE annual plan.

5. Use of consulting firms

The VE Program may contract specialized and experienced consulting firms to conduct VE studies on some projects and/or elements of the projects to study.

The members of the consulting firm team must be experts in their field, have preferable completed a recognized VE workshop, and have previously participated in similar VE studies.

The team facilitator must be an expert in VE, have completed the requirements to comply with his certification as a VE expert, or an equivalent certification by a recognized organization.

Definitely, the VE Program will never contract a consulting firm that is involved -directly or indirectly- in the design of the project.

It is recommended that a knowledgeable member of the consulting design firm participates as member of the VE team.

6. Eligibility for financial support

The cost of the study of VE is related to the project design and preparation, therefore is eligible -as local contribution or direct technical assistance- for financing within the financial programs of international development organizations, such as The World Bank, that support this type of activity.

7. Format to be used for the VE reports.

The format of any VE study must shown:

a. Cover of the study with information,

b. History of the project, background,

c. Potential areas of analysis,

d. Sources of information and investigation,

e. Existing design,

f. Basic and secondary functions, FAST diagram,

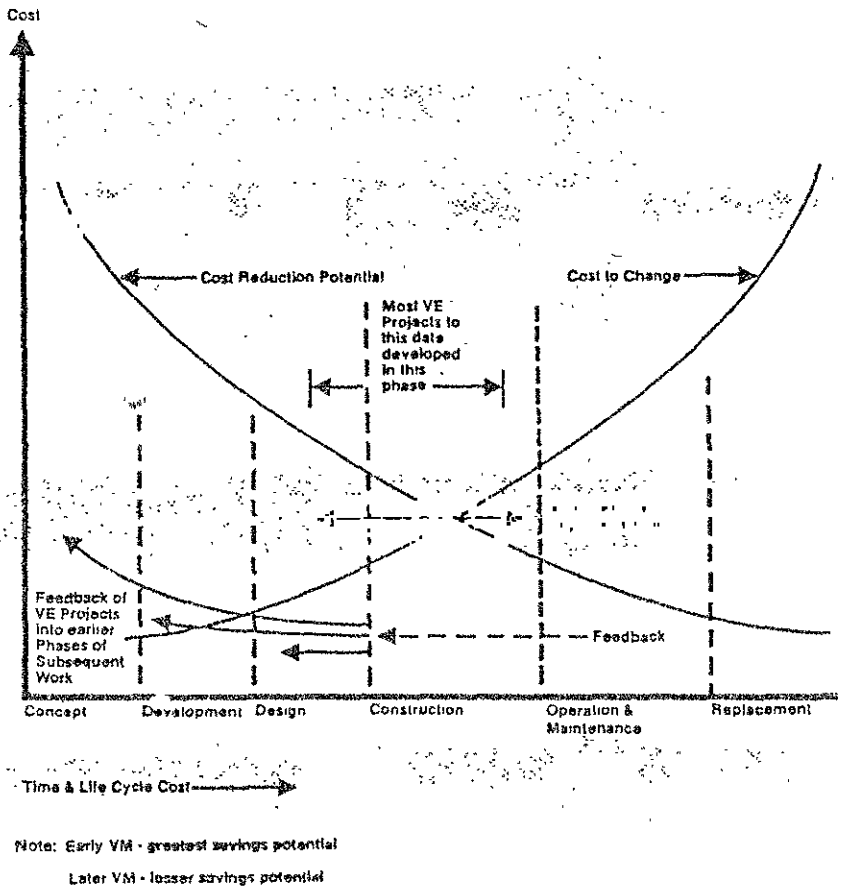


Figura 1-1. Potencial de reducción de costos y costo de los cambios

g. Actual method for cost estimates,

h. Identification of alternative ideas,

i. Cost estimates for the alternatives,

j. Evaluation matrix,

k. Proposed or suggested design, and

l. Findings, detailed analysis and specific recommendations.

C. Project Selection.

It is important to select projects that offer the maximum opportunity to improve the value of the investments through initial capital savings and savings during the life of the project. The same concept applies to the elements to be studied within a project.

Figure 1 shows the time lapse considered most appropriated to do the VE study or studies, as a function of the potential savings and the implementation cost of the suggested alternative.

Figure 1. Opportunity of a VE study

Another accepted and useful approach to project selection and the items to be studied within the project, is based in the curve of Pareto, known as the "Law of distribution".

This curve is based on the principle that, in general, a small percentage of the elements of a project - approximately 20%- is responsible for almost 80% of its costs.

It can be established then, that these elements (20% of the project total) contain the most potential to improve their value.

Not all the projects will be candidates for a successful study of Value Engineering. The process of project selection involves not only how the projects are to be identified, but also the establishment of parameters related with the VE objectives.

D. Factors to be considered for project selection

The significant factors in the process of project selection to be analyzed, are the following:

1. Phase of design in which to do the VE study

   Although a VE study can be done at any stage in a project, selected projects should preferable be -as much as possible- in the feasibility phase of design.

2. Revision of the tentative work plan

   Review the Work Program identifying as potential candidates of VE evaluation those projects where the cost of construction and the acquisition of land add to more than three hundred (300) million Philippine pesos.

3. Authority to select the projects.

   The Program of Value Engineering will have the responsibility of identifying and developing the VE annual work plan, consistent with the recommendations here presented.

4. The annual work plan may require to give priority to the VE projects. The following criteria may be used to determine such priorities:

a. All projects with an estimated initial cost of construction that exceeds PP300 million,

b. All projects that substantially exceed the initial cost estimate,

c. All those projects that involve multiple and complex items, equipment or processes that provide unique but expensive functions.

d. All projects with items that use critical, special or very expensive materials, the use of materials available only as imports, or those where their volume of production do not answer the demand.

e. Projects with items that require construction or procedures of difficult manufacturing; those projects that require special treatment of soils, as in the case of expansive or collapsible soils.

f. Projects with items that simply appear very expensive to build, operate or maintain. Here it is important the experience of the professional that selects the projects to VE.

g. Projects with important, complex structures, for instance bridges, tunnels, retaining walls, etc.

Value Engineering techniques can be used to improve the value of the "Internal Rate of Return" at each aspect of the Work program, including preliminary engineering, traffic operations, maintenance, plans and specifications, and design criteria.

5. Other concepts to be aware of for the selection and grouping of the projects to VE are:

h. projects with similar regional localization, ideally with the same topographic and physical conditions.

i. projects of the same type of work or the same nature

E. The Annual VE Work Plan

The Annual VE Plan will be dynamic, defined by the general process of advance and development of the projects

in the pipeline. As a consequence, the Plan will require a constant revision and actualization.

Significant factors that affect the Annual Work Plan are the following:

1. Activation dates

   The Annual VE Work Plan should be effective on a fix date to be determined (it may be January 1st) and to be in relation with the fiscal year.

   It should also be interconnected with he disbursement program of international development organizations in the Philippines.

   The process of project selection of plans and programs could then start around November 1st, with the approval and final acceptance estimated for the first of the year, each year.

2. Plan update

   The VE working plan should be updated every three months.

Annex V - SUMMARY OF A TWO-DAY STUDY FINDINGS

The following ideas were generated in a brief VE exercise, using the brainstorming technique, on the Cabanatuan By-Pass project. Only a few functions were tested.

#	Suggested Ideas

Function: Transfer Loads

1. Thickness redesign
2. Asphalt pavement
3. Asphalt concrete
4. Use composite
5. Treated cement
6. Soil cement
7. Reduce calculus coefficients
8. Lower pavement throughout*
9. Use geogrids
10. Lower pavement only on one way
13. Provide box culverts
18. Use asphalt in lieu of concrete pavement*

Function: Move vehicles

11. Use three lanes in lieu of four
12. Eliminate shoulders
14. Raise side roads
16. Keep same pavement level
17. Use metal culvert
19. Reduce width of carriageway
22. No by-pass, use existing highway
43. Reduce with of center island*

Function: Move people

15. Redesign pedestrian bridge
44. Bridge in lieu of tunnel

Function: Improve safety

20. Redesign pavement markers
21. Use barriers
23. Eliminate accesses and use for by-pass only
24. Eliminate trees in center island

#	Suggested Ideas

Function: Improve safety (cont.)

25. Improve road signage
41. Use gravel in lieu of paved shoulders*
42. Eliminate frontage road*

Function: Span river

29. Lowering bridge*
30. Stage construction
31. Steel in lieu of trusses
32. Use metal culverts
33. Shorter spans
34. Larger spans
35. Reduce shoulders at bridge
36. Use different foundation*
37. Narrower bridge
38. Delete one of the two parallel bridges
39. Combine two bridges
40. Build one three-lane bridge

* Some of these ideas have been further evaluated and indicated their potential for substantial savings.

Annex VI - BRIEFING'S GUIDELINES

What is VE, Value Engineering?

Value Engineering, or Value Analysis, is a professionally applied, function oriented, creative and systematic team approach, used to analyze and improve value in construction — a powerful methodology for solving problems and/or reducing costs while improving performance and quality requirements. By enhancing value, Value Engineering increases customer satisfaction and adds worth to investments. VE applies to any business or economic sector, including infrastructure, transportation and building construction.

VE reduces construction costs by preventing unnecessary items, focusing on obtaining the required project characteristics and improving functionality while reducing total cost. The final objective is to provide a balance of quality, performance and functionality minimizing construction, operation and maintenance costs. It is applied to a wide variety of private and public projects in the USA and the world.

Public Law 104-106, signed in 1996, requires from each executive agency "cost-effective VE procedures and processes"; annual savings in federal projects averaged more than $2 Billion, a 3 to 5% of total investment costs.

SAVE International, is the professional society devoted to the advancement and promotion of VE. CAS is a recognized member of SAVE and its principal and main associates are all Certified Value Specialists, CVS, registered by SAVE in the United States of America.

Why do Cost Overruns exist in a Project?

The perfect project does not exist; the ten best professional firms, facing the same problem and with the same parameters, will develop ten different projects with ten different costs; every one of these projects could improve with the ideas of the others. **Projects can be improved because they always carry unnecessary components.**

Some of the recognizable causes why variations in costs occur are due to differences in:

- planning and development criteria and philosophy;
- amount of time allowed to developing the project;
- organizational capabilities, in house coordination;
- honest misconceptions, biased thinking;
- habitual thinking, tendency to use proved designs;
- assumptions made at various times during the design process;
- creative thoughts affected by lack of intellectual and/or professional stimulus;
- difficulty in being scientifically "up to date"
- political circumstances
- project approval by owners, users, banks, etc.;

and many more impossible to enumerate here.

All projects are subject to improvement; the objective of the studies of Value Engineering is to improve a project by reducing or eliminating unnecessary costs.

Value Engineering methodology

The main difference between **Value Engineering** and the traditional methods of cost reduction, is its **focusing on functional analysis.**

The essence of the VE discipline is the evaluation of the functions of a system or product, that is to analyze what this system or product supposes to do or perform under which circumstances.

After identifying the different functions, the methodology of **Value Engineering** develops, through creative techniques, **alternative ways of reaching the same function at the lowest possible cost,** maintaining or improving at the same time the performance of the project.

If we apply the Cost-Benefit analysis equation to the project, Value Engineering increases its internal Rate of Return by reducing costs while keeping or adding benefits.

This approach requires valid and concrete responses to the six following questions:

- What is it?
- What does it do?
- What must it do?
- What is it worth?
- How much does it cost?
- What else will do the same function?
- How much will it cost?

Value Enginaering requires a team effort by managers, professionals, technicians, specialists and all those who participate in the decision making phase of the construction process.

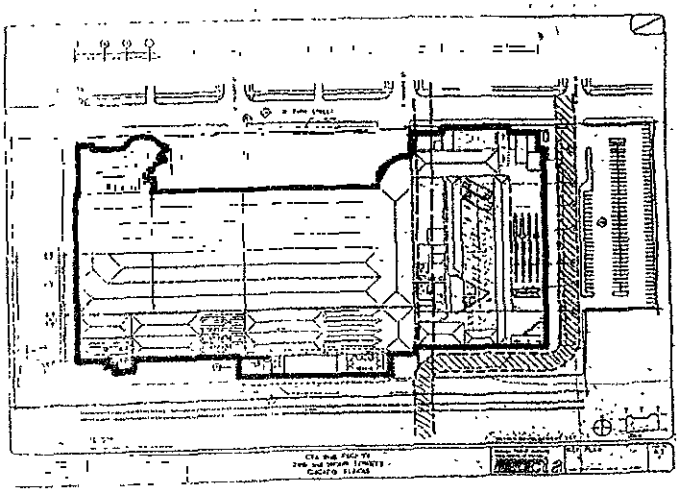
CAS

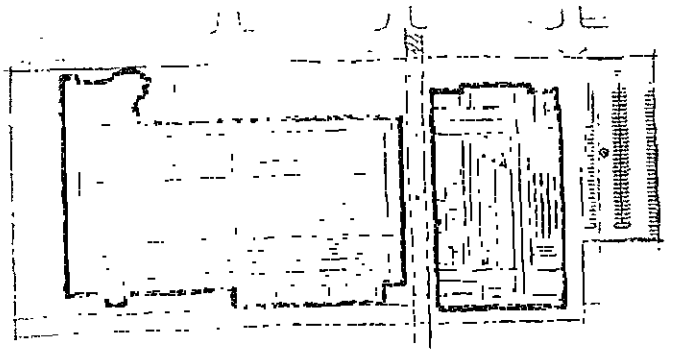
a few samples of our work ...

the following ideas are the result of Value Engineering studies performed by CAS; given their ingenuity and efficiency, they appear as simple and obvious, however were evident only after a methodical and rigorous functional analysis

(the names of the affected parties are protected)

AS DESIGNED





VE ALTERNATIVE

Samples of Value Engineering alternatives suggested by CAS

- Regional Garage

  Chicago, Illinois, U.S.A.

a) As Designed

- Building occupies two blocks; main sewer line lies through the site and requires to be relocated.

- Cost as designed:
  $4,444,540
  this is the cost of the sewer relocation.

b) VE Alternative

- Separate the building according to its functions, keeping the garage on the West side, and the administration, maintenance and repairs on the East side; main sewer line remains on its original position.

- Cost of alternative:
  $146,847
  this is the cost of building new exterior walls and connectors between the two wings of the building.

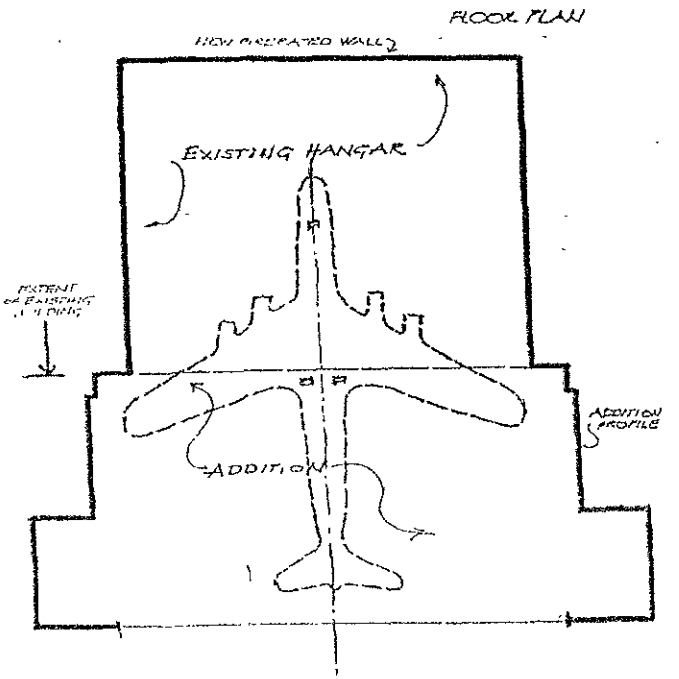
c. Advantages

- Savings in initial investment of $4,297,693

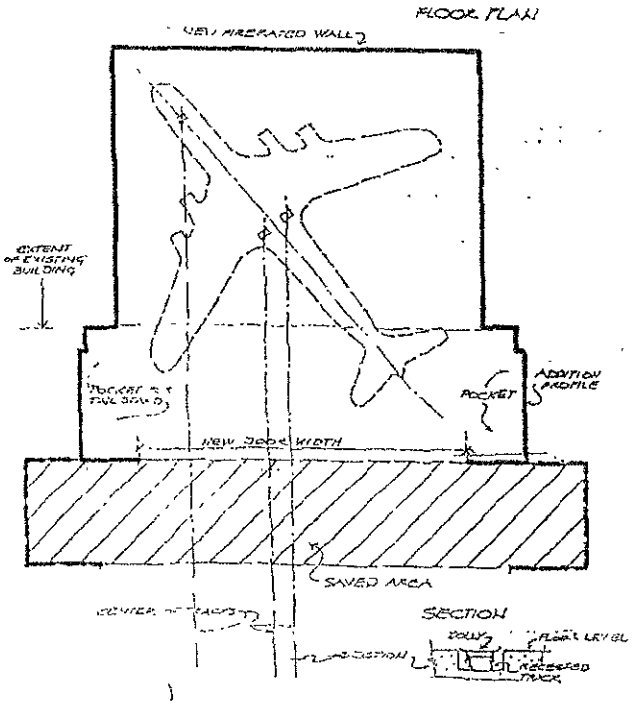
- Reduced total construction time and eliminates a trade.

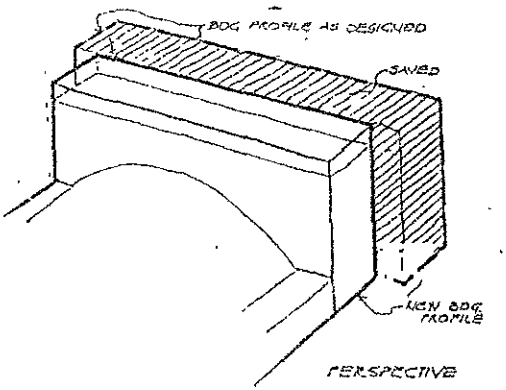
- Better fire protection separating the garage from the administrative functions; lower insurance costs.

AS DESIGNED


FLOOR PLAN
NEW PROPOSED WALL
EXISTING HANGAR
EXTENT OF EXISTING
ADDITION PROFILE
ADDITION

VE ALTERNATIVE





Samples of Value Engineering alternatives suggested by CAS

- Maintenance Hangar

  Maryland, U.S.A.

a) As Designed

- The plane rolls on its own wheels into the hangar; it requires 24,437 square feet of covered area, with a 180 foot wide hangar door.

- Cost as designed: $3.900.050 this is the cost of building an addition to the existing hangar of 24,437 square feet and installing a 180' door.

b) VE Alternative

- The plane is introduced to the hangar at an angle, resting its wheels on specially designed carts on rails; it requires 11,842 square feet of covered area and a 160' wide hangar door.

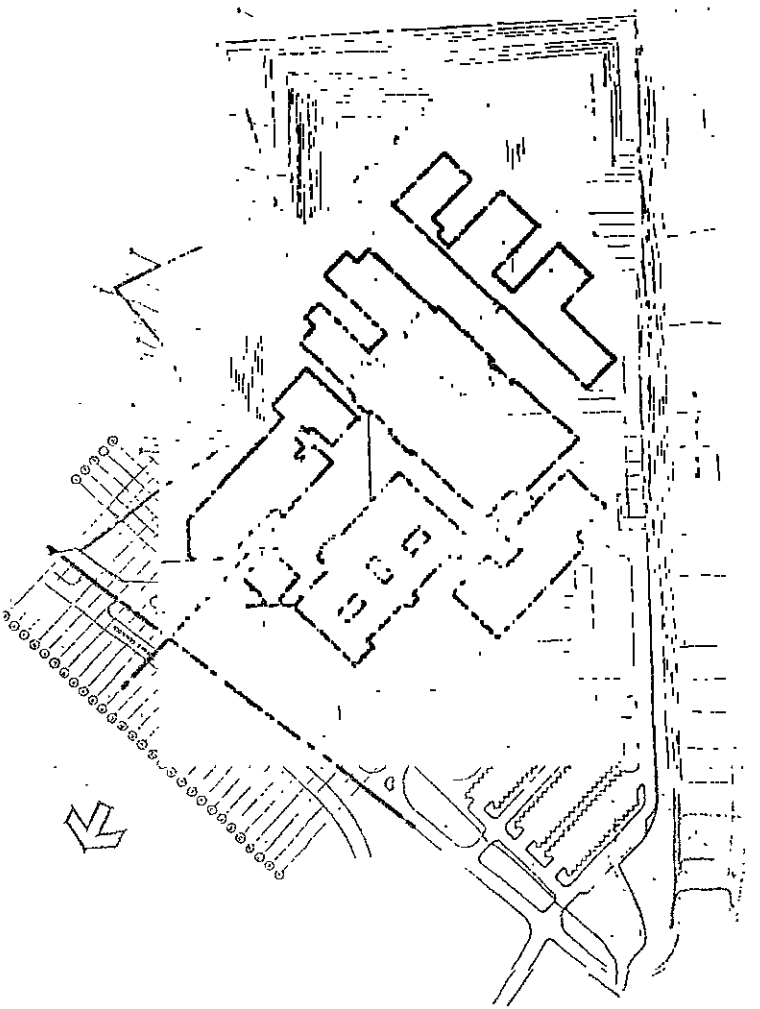
- Cost of alternative: $2,945,417 this is the cost of building a smaller addition and installing a smaller hangar door.

c. Advantages

- Savings in initial investment of $954,633

- Present value of savings during life cycle, due to lower maintenance area, $1,367,090

AS DESIGNED



Samples of Value Engineering alternatives suggested by CAS

- General Hospital

  Costa Rica, Centroamerica.

a) As Designed

- General hospital complex for 360 beds, designed on a rectangular grid placed parallel to the main street and at an angle with topographic lines (grading)

- Cost as designed:
  $2,345,517
  this is the cost of earth moving — filling and excavation — needed.

b) VE Alternative

- Rotate grid counterclockwise 31° placing it parallel with the topographic lines (grading) and at an angle with the main street to the front.

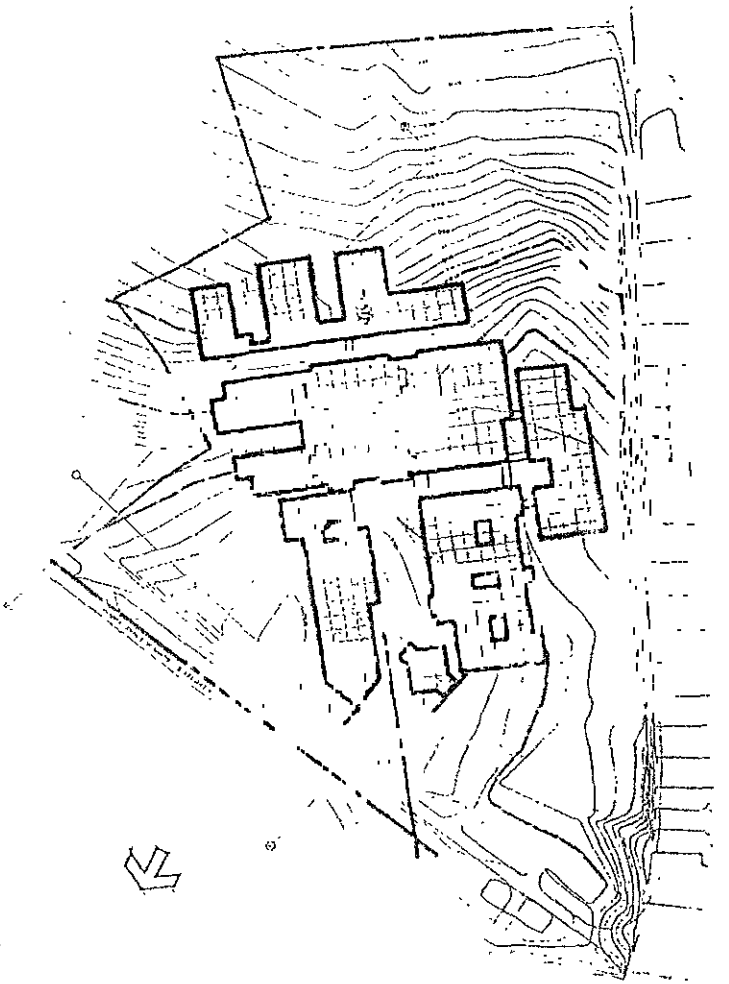
- Cost of alternative:
  $476,673
  this is the cost of fillings and excavations needed after rotating the basic grid, computed as the optimum position.

c. Advantages

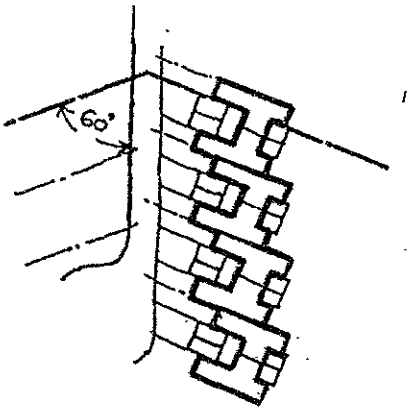
- Savings in initial investment of $1,868,844

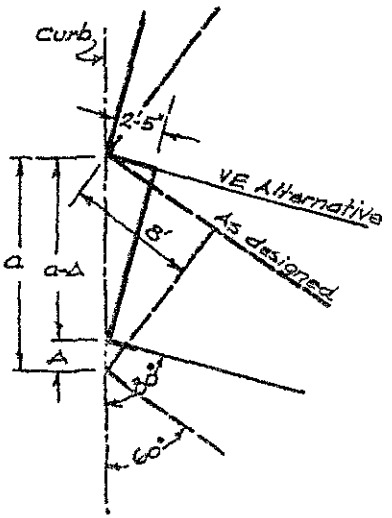
- Important reduction in soil erosion, smaller impact on the environment.

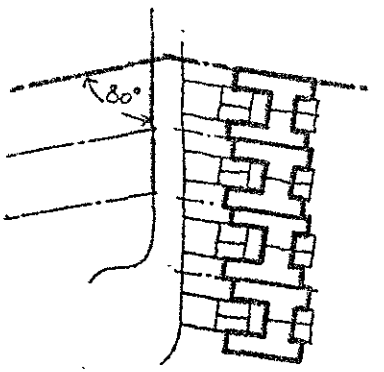
VE ALTERNATIVE



AS DESIGNED







VE ALTERNATIVE

Samples of Value Engineering alternatives suggested by CAS

- Housing Development

  Puerto Rico, U.S.A.

a) As Designed

- Individual townhouses with common walls at 60° with the front building line; average length of common walls is 60'.
- Cost as designed: $616,265 this is the cost of the common walls at 60°.

b) VE Alternative

- Keep the townhouse layout, but with common walls at 80° with the building front line; length of common walls is now 14.40 meters.
- Cost of alternative: $493,012 this is the cost of building shorter common walls at 80° with the front line.

c. Advantages

- Savings in initial investment of $123,253
- It reduces the length of curb per dwelling unit and therefore the extension of water, sewer, electricity, gas and telephone lines.
- It keeps the shadow effect manifested by the architects with similar breaks between dwelling units.

Samples of Value Engineering alternatives suggested by CAS

- National Highway N°127

  Sector Miñones-La Hierra
  Entre Ríos, Argentina.

a) **As Designed**

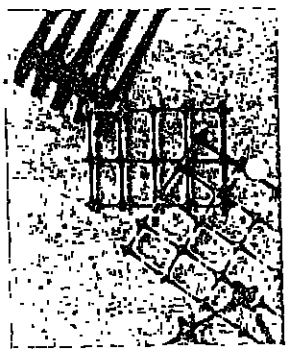
- Granular soil 15 cm, granular subbase 15 cm and base 15 cm.
- Cost as designed: $31.08/m2 this is the cost of the base and subbase as estimated.

b) **VE Alternative**

- Use a high tension structural geogrid (Tensar) to reinforce the granular base and subbase.
- Cost of alternative: $29.00/m2 this is the cost of reduced thickness base and subbase plus the cost of the geogrid.

c. **Advantages**

- Savings in initial investment of $635,041
- Reduced total construction time allowing an earlier use of the road surface.
- Reduced thickness of base and subbase, with the consequent reduction in volume of enbankments and drains.
- Structural geogrids allow the reduction in the thickness of base agregate layers with no loss in capability.



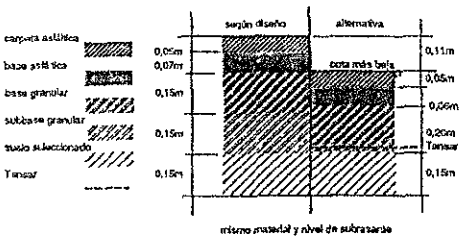


Figura 2.05.a - Composición del pavimento con base reforzada oportunamente Tensar

VE History

Beginnings

Value Engineering had its origin during World War II at General Electric Company, where it was noticed that many of the substitute materials (forced by wartime shortages for war critical materials) being used in equipment reduced costs, yet maintained, or in some cases improved, the performance of the product.

At that time, Harry Erlicher, who observed many of these occurrences, thought that perhaps such substitutions in the product could be made in a methodical and deliberate manner rather than as a result of material shortages or other compulsory changes.

Erlicher called on Lawrence Miles, who worked for him, and gave him the task of answering this question.

Larry Miles

By education and training a professional engineer, during the second world war he was charged with procuring material for manufacturing products that had a relative low military priority.

Being not able to obtain the parts needed through traditional methods, he decided to start specifying the materials needed based on their function rather than on their physical description.

He noted that, free from the confines of a named part, people were being innovative in the selection of products.

On the other hand, he observed that the cost of the parts thus specified was lower; they performed sometimes better and were readily available -- which was the first consideration.

This concept is similar to the "Regulate by Results" concept utilized in some building codes and zoning regulations. Instead of defining the characteristics

of the product, the product needed is defined by its use, or "**function.**"

See Lawrence Miles Curriculum Vitae in Appendix

Functions

The decision to use functions rather than named components was producing beneficial results.

It produced the required results of reducing costs while retaining (or improving) the required functions of the product.

Lawrence Miles took the first steps into the Value Analysis process and GE decided to foster its early development, sharing this initial effort with others and forming a research group headed by Larry Miles; a **function based decision making process** was started.

Mr. Miles initially intended to use this process for procurement decisions and generation of manufacturer products but GE considered it as a possible management standard practice.

Subsequently, Mr. Miles developed what is known today as value engineering.

It is said that he did not know how to call this technique and not named it. His manager said let's call it **Value Analysis.**

Today, Mr. Lawrence (Larry) Miles is considered the father of the Value Methodology.

THE JOB PLAN

THE SEVEN PHASES

ORIENTATION

1. INFORMATION

2. SPECULATION

3. ANALYSIS

4. DEVELOPMENT

5. PRESENTATION

6. IMPLEMENTATION

7. FOLLOW-UP

ORIENTATION

PROCEDURE

SUBMIT IDEAS FOR PROJECTS

EVALUATE THEIR POTENTIAL FOR RETURN ON INVESTMENT AND FOR

TIME TO IMPLEMENT RESULTS

SELECT PROJECTS FOR PLANNING

PLAN THE SPECIFIC PROJECT

APPOINT THE TEAM

ALLOCATE RESOURCES

SET GOALS

SET MILESTONES

RECONFIRM PROJECT POTENTIAL

ESTABLISH PRIORITY

APPROVE PROJECT START

Figure 5.0 – Orientation Phase of the Job Plan

1. INFORMATION PHASE

QUESTIONS

WHAT IS IT?

WHAT DOES IT DO?

WHAT MUST IT DO?

WHAT DOES IT COST?

WHAT IS IT WORTH?

PROCEDURE

USE GOOD HUMAN RELATIONS

GET ALL THE FACTS

GET INFORMATION FROM THE BEST SOURCES

OBTAIN COMPLETE INFORMATION

PERFORM FUNCTIONAL EVALUATION

DEFINE FUNCTIONS

DETERMINE COST

DETERMINE WORTH

COMPUTE VALUE INDEXES

Figure 5.1 — Phase 1 of the Job Plan

Law now mandates Value Engineering

Public Law 104-106 was signed on February 10, 1996. It reads as follows:

SEC. 4306. VALUE ENGINEERING FOR FEDERAL AGENCIES

(a) USE OF VALUE ENGINEERING. - The Office of Federal Procurement Policy Act (41 U.S.C. 401 et seq.), as amended by section 4203, is further amended by adding at the end the following new section:

"SEC. 36 VALUE ENGINEERING

"(a) IN GENERAL. - Each executive agency shall establish and maintain cost-effective value engineering procedures and processes.

"(b) DEFINITION. - As used in this section, the term 'value engineering' means an analysis of the functions of a program, project, system, product, item of equipment, building, facility, service, or supply of an executive agency performed by qualified agency or contractor personnel, directed at improving performance, reliability, quality, safety, and life cycle costs."

(b) CLERICAL AMENDMENT. - The table of contents for such Act, contained in section 1(b), is amended by adding at the end the following new item: "Sec. 36. Value Engineering."