

1993 SAVE PROCEEDINGS

CHANGING PARETO'S LAW TO MEET TODAY'S VE MARKET PLACE

This document was presented at the 1993 International Conference of the Society of American Value Engineers (SAVE) at Fort Lauderdale, Florida by Bernard W. Stainton-Jaffe, Hanscomb Associates. It was published in the SAVE Annual Proceedings and is copyrighted (SAVE, 1993). Permission to upload this document to CompuServe has been given by SAVE.

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Mr. Stainton-Jaffe has published widely and presented several papers at SAVE International conferences. He was awarded the SAVE Distinguished Service Award for 1992 can be provided for a lower, more reasonable and acceptable fee.

ABSTRACT

This paper addresses a realistic and marketable approach to Value Engineering (VE), designed to meet today's needs. It discusses how the traditional VE methodology can be used and specifically directed towards achieving at least 90% of the normally predictable VE Study results using only 40% of the time and effort that is usually expended on a 40 hour VE study workshop. The recently issued revised General Service Administration/PBS VE Handbook has been modeled in part on the techniques being presented here

PREFACE

For this paper it is assumed that the reader is familiar with VE and the terms being used, the basic VE Methodology and Job Plan et cetera. For this reason, these topics will not be addressed in-depth or as part of the technique being presented.

BACKGROUND

This paper and the VE techniques outlined are the consequence of a response to a creative Request for Proposal (RFP) which called for an innovative approach for providing VE Services to a prospective client.

The VE Services were required to:

- Enhance but not delay the project design and delivery process.
- Ensure that the project design is responsive to the program requirements, form and function.
- Serve to improve or maintain the project quality, and optimize operation and maintenance costs [Life Cycle Cost (LCC)].
- Maintain the estimated probable cost of construction within the appropriated budget.
- Support the intention of creating a facility that will become part of the heritage of the state (and the USA).

Turning to Pareto's law of Distribution for a possible solution, it was not unreasonable to assume that 80% of the project cost/VE Study results could be found within 20% of the sum/VE Workshop effort. In practice, it has since been proven that at least 90% of the usually predictable and expected initial cost savings and LCC benefits, resulting from a conventional 40 hour VE Workshop session, can be achieved through the application and conduct of an intensive 16 hour VE Workshop session, when combined with the required traditional and supportive VE Methodology activities.

It has also been found in practice, that all of the usually desired blend of VE objectives and the requirements of the original RFP are being satisfied in full through the application of the techniques outlined herein.

For the professional VE Services Consultant this translates into the following:

- A more marketable and effective VE Service that

- A VE Service that will provide useable results when they are most needed during the design.
- A VE Service that avoids most conflicts and project design time delays with their implied added cost impact for the owner, user, design consultants and various other construction and funding interests.

INTRODUCTION

The origin and adoption of the commonly used, and most often practiced, 40 hour VE Workshop was established many years ago. It was designed to allow a reasonable period for two directly related activities to be accomplished: provide VE training for candidates; and, allow time for their participation in a live "hands on" VE Workshop project study. This makes sense of course, and is certainly still needed to ensure that an in depth understanding of VE, its historical background and the VE theory is provided for the student, plus making sure that a practical working knowledge of an actual VE Workshop is being assimilated during the same 40 hour VE training workshop.

However, in the actual practice of VE, there is no need to allow time for theory and training, and as such, 20 hours or more can be deducted from the 40 hour VE Workshop session. Using VE trained and certified design professionals as the VE Workshop team members for the remaining 20 hours or less, one can quickly see that a highly productive VE Workshop session can easily be initiated and used within an abbreviated workshop time frame. This is, in effect, the basis of the VE technique being presented in this paper. It is very possible to achieve at least 90-95% of the usually expected and predictable VE Study results through the application of an abbreviated VE workshop session. The technique and methodology requires significantly less time and still provides excellent value and cost benefits for the project and the client.

Since time is money, this proven VE Workshop technique is more marketable for the VEServices professional, particularly in today's fast moving world of design and construction.

PHILOSOPHY AND OVERALL OBJECTIVES

The philosophy of most VE Studies and indeed most VE Programs, is to provide improved value for the project with respect to budget constraints and with consideration of overall LCC. The objective of any specific study must be consistent with this philosophy considering the individual requirements of the project.

For a project whose construction cost is within budget, the emphasis is on maintaining or improving value in terms of operations, flexibility, expandability, etc. If this can be delivered at reduced cost then cost reduction becomes a secondary goal with the possibility of reducing the budget.

When a project is above budget, emphasis is on reducing construction cost to within budget while maintaining or improving value delivered. VE is not intended to merely produce cost reductions by "cost cutting" - e.g. reducing cost at reduced value.

As a general rule, no constraints are placed on the VE program in terms of areas of study for projects. Likewise

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governing criteria, except as required by codes or law, is considered open for challenge by the VE Services contractor, providing that the value and cost benefits are worthwhile and no compromises are made to important project functions.

For a specific project, any constraints to be placed on the study must be identified and justified prior to the VE study. Normally such constraints are the result of specific studies carried out by the Design Consultant and not just the result of the normal design process.

Conversely, the VE Services contractor is expected to use "common sense" in challenging design decisions or criteria which are deep seeded and important issues to the owner/user and Design Consultant. "Common sense" would be a reasonable judgement of the benefits to be gained versus the effort to implement and the likelihood of eventual acceptance.

Other value concepts that could apply include unnecessary expenditure of funds (cost avoidance) more real estate for the same expenditure (program) improved space relationship (use logistics) and related site needs (fire fighting access, users on site vehicle logistics etc).

TIMING OF STUDIES

VE Services, as stated later in the suggested Scope of Work, consist of a minimum of two studies conducted at: 1. The Schematic Design Phase submittal (Owner plan review period). 2. The Design Development Phase submittal (Owner plan review period). Additional studies may be conducted at continuing levels of Design and even for final Construction Documents if deemed necessary due to technical or budget constraints.

The basic approach is intended to consider macro level issues at the Schematic Design Phase and more micro level issues at the Design Development Phase. In general, decisions made as a result of the first VE Study will not be revisited or reconsidered in the second VE Study unless significant new information is available. Furthermore, design changes implemented as a result of the VE Studies will be considered to be within the bounds of any normal design review. Exceptions to this are sometimes considered by mutual consent of the owner and design consultant if major redesign is warranted.

Experience has shown that it is most beneficial to a project if the owners' review specialists and the facility users participate in each VE Study workshop. In practice, the project drawings and documents get a more thorough plan review, as a consequence of the VE Study workshop process, than by the more traditional "individual-in-office" review usually conducted by the owner/user at each design phase submittal.

SELECTING THE VE SERVICES CONTRACTOR

As in most businesses and sports, the speed of the team is the speed of the leader. It therefore becomes very important, especially for an abbreviated VE workshop session, to select a project VE Study Team Leader (VETC) who is highly skilled, experienced and motivated.

The VETC should be a certified Value Specialist (CVS) with a minimum of 10 years VE and professional design and construction experience. Other skills should include technical report writing, oral presentation capability and related technical degrees.

VE team members provide the technical input to VE studies in programming, architecture, engineering, cost estimating, specifications and special areas (environmental, asbestos, building automation, etc.) Minimal qualifications should include;

- Appropriate technical degrees and professional registrations. (It is extremely important that the skills and experience of the VE team are equal to or superior to those of the design consultant(s).
- Completion of a formal 40-hour VE training session, experience in the design, construction and operation of buildings of similar nature, scope and complexity as those contemplated.

The mix of proposed disciplines and experience of the team should be sufficient to cover the anticipated needs of the projects to be studied. This should include as a minimum the normal architectural and engineering disciplines and a skilled estimator for each workshop. Special disciplines appropriate to the projects under consideration may also be included.

Most successful VE programs, particularly in building design and construction, require that the VE Services Contractor and VE Team members not be directly associated with the project Design Consultant(s) and/or their agents; for example, major services in the form of estimating or discipline designers.

An exception is usually to be found in the manufacturing and production industries where "in-house" VE is commonly used. The VE Team motivation is different in as much as it is specifically directed at producing an improved and acceptable product at a lower cost, usually in quantity. The VE Team is therefore very goal oriented and not as sensitive as to who is doing what to whom.

Additional qualifications are pertinent to the conduct of VE studies and should be considered in the selection of the VE Services Contractor. These include:

- (1) Availability of cost and performance information on similar facilities to those under consideration. This information is useful in determining potential areas of study as well as providing data for cost evaluation of VE proposals.
- (2) Word processing and other automation systems useful in supporting VE studies and producing reports.
- (3) Support disciplines such as graphics that can enhance the quality of printed material.
- (4) Management and administrative systems useful in supporting indefinite quantity contracts (as appropriate).

SCOPE OF WORK

The VE Services usually consist of a VE/LCC Review Study of the project Schematic Design Phase drawings and documents. This is followed with a companion VE/LCC Review Study of the project Design Development Phase drawings and documents.

Each VE/LCC Review Study includes a post workshop decision making meeting. It intended that the Owner/User will provide specific instruction to the Design Consultants with directives on how to proceed with the next phase of design of the project as a consequence of each decision making meeting.

VE/LCC Review Approach

The VE approach follows the basic five-step job plan and procedures generally acknowledged by the SAVE. Each VE study involves three phases:

- Phase A - Pre-workshop
- Phase B - Workshop
- Phase C - Presentation of results and decision-making meeting and report

The approach is structured and directed towards obtaining the maximum effect from the expended efforts. (Refer to VE/LCC study agenda) This involves:

- A. A thorough pre-workshop preparation with the Owner/User and the Design Consultants that includes assembling a workbook, a briefing on project status, the selection of appropriate VE team personnel, and all the logistical organization necessary to ensure that the workshop session will be productive and proceeds smoothly.

Materials required for the efficient conduct of the VE workshop to be supplied by the Owner and Design team shall include, but not be limited to:

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- Project program and budget development documents;
- Definitive drawings for the level of design under study;
- Outline or definitive specifications of major construction elements;
- Program areas/spaces analysis with respect to program;
- Line item cost estimates for the level of design under study (CSI/UNIFORMAT);
- Definition of major systems and subsystems including architectural, structural, mechanical, electrical, sitework, and utilities. Design Consultant's design concepts shall be supported by LCC techniques;
- Plot plan, topography, and site planning, even photographs are useful when available.
- Verification of power, sewer, gas, etc. availability for selected site;
- Soils report with response for foundation design concepts indicated on drawings;
- Special systems or requirements;
- Economic data, budget constraints, discount rate, useful life of facility

The timely and careful preparation of most critical Information Phase work sheets before the VE/LCC Workshop greatly enhances the results of the study. It also enables each VE team member to be informed and well prepared for the design consultant's project briefing which is given at the commencement of each workshop.

As a minimum I recommend that the following worksheets be completed prior to the workshop session:

- Cost model(s) using the project cost estimate
- Function analysis for total project and pertinent high cost systems as appropriate
- Graphic function analysis for total project and pertinent high cost systems as appropriate
- FAST diagram for total project and pertinent high cost systems as appropriate.

A good guide for the various function analysis items is to follow the 80%-20% Pareto's Law of Distribution.

This methodology will allow the VE team to quickly focus on areas having the best potential for initial cost reductions through a repetitive analogy of the high cost items as appropriate.

Each VE workshop team member will be required to review the project design and information package supplied by owner during the week prior to the workshop, as knowledge of the project is of utmost importance in successfully conducting a VE/LCC review workshop, particularly one of abbreviated duration being used.

The foregoing procedures allows the VE team to have a meaningful dialogue with the design team immediately when the workshop convenes and allows speedy movement into the speculative phase of the workplan.

- B. The VE workshop now closely follows the generally applied VE phased workplan:
- Information phase
 - Function analysis phase
 - Identification of alternatives (speculative phase)
 - Evaluation phase
 - Development phase (cost and LCC)
 - Presentation (informal at close of workshop)

It should be mentioned at this time that the VE Recommendation sheet used for this type of VE Study is also

abbreviated some. The function of the recommendation sheet is: to communicate information, and allow informed decisions to be made. Since the Owner/User and Design Consultant all participate in the VE/LCC workshop at some time, it is necessary to provide "basic" but "accurate" information on this worksheet. The information that is required should include: Idea number; Idea description; Potential initial cost savings (or added cost) potential LCC benefits and a space for the action taken at the decision making meeting by all interested parties. Other information that is considered useful are sketches, advantages and disadvantages, a discussion, if necessary, and brief costing information provided by the VE team cost estimator. The cost data is intended to indicate the probable order of magnitude of the cost savings (or added cost) that may reasonably be expected from the implementation of the VE alternate design proposal recommendation.

Design suggestions are treated in a similar manner. In either scenarios the work sheet needs to tell the complete story as much as time allows. VE Team member expertise is essential in the development phase to ensure positive results.

Considerable emphasis is placed upon innovative recommendations that avoid simple cost-cutting ideas, but are tailored to fit the particular project, its objectives, and the overall budget status.

- C. Presentation of results, decision-making meeting and report. Since the VE Study methodology is compressed in time it is beneficial to the VE study to make an informal brief of the workshop results to the Owner/User and Design Consultant at the conclusion of the workshop session. Copies of the creative idea listing worksheets may be given to the Design Consultant to allow them to review potential alternative design opportunities prior to the decision making meeting.

The VETC and VE team members meet with the Owner/User and the Design Consultant's for a decision making meeting on the second day after the VE workshop. The reason for this is two-fold. It allows the Design Consultant to prepare most of their responses and comments on the results of the VE workshop, and it also allows the VETC to check, verify and complete the contents of each VE/LCC proposal and design suggestion in readiness for the decision making meeting. (refer to VE/LCC study agenda).

The decision making meeting is organized to allow informed decisions to be made on each VE recommendation by all of the project design participants including the designers, owners, users and frequently the construction managers. The role of the VETC is to assist the conducting of the meeting and to provide professional VE guidance towards achieving the clients VE program and project objectives. Following the decision making meeting the VETC prepares a final VE/LCC review report which should include but not be limited to:

- Executive report and summary of VE study results including a matrix of decision making meeting resolutions for each proposal and design suggestion.
- E/LCC review proposals and design suggestions.
- Methodology and worksheets including project background and information, VE/LCC review participants, models and analyses, economic data, idea listings.
- Appendix including items such as workshop agenda, project directory and miscellaneous materials as appropriate.

Summary

The success of the techniques presented in this paper rely on several major issues as follows:

- Selection of a highly skilled, experienced and motivated professional VE team leader and CVS
- Selection of practicing design professionals with VE training and experience as VE team members.

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- No direct association with the project design group.
- The availability of accurate and comprehensive cost data is an essential element in the success of all VE studies.
- Thorough pre workshop preparation by VETC and VE team members.
- Effective use of VE workshop time and resources
- Effective decision making meeting procedures
- Production and distribution of VE/LCC review report within one week of decision making meeting.

If the techniques and methodology outlined herein are diligently followed a successful project VE/LCC review is assured, together with the sense of "making good things happen on purpose", with no delay to the project delivery schedule.

Level of Effort (Two Day Workshop Session) Cost Worksheet

The following basic format is suggested to determine the VE/LCC Review Study effort and associated costs.

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Tasks	VETC	Arch	Str u	Mech	Elec	Cost	Other	Adm	Total s
1. Site Visit									
2. Briefing by Design Team									
3. Pre-Workshop	12	2	2	2	2	2		8	30
4. Workshop	16	16	16	16	16	16		-	96
5. Decision Meeting	3	3	3	3	3	3			18
6. Preparation of Report	40							40	80
Totals	71	21	21	21	21	21		48	224

A. Labor:

Team Members	Hours	X	Billable Rate \$/HR.	=	Sub Totals
VETC	71	X		=	
Arch.	21	X		=	
Other Team Members	21	X		=	
Administration	48	X		+	

A. Total Labor Cost \$ _____

B. Expenses: (usually at cost)
 Meeting room (if not provided by client)
 Communications
 Printing & delivery
 Transportation (air/ground)
 Per diem (by agreement with client)
 Misc. materials _____

B. Total Expenses Cost \$ _____

C. Grand Total (A + B) = \$ _____

Typical VE/LCC Review Workshop Agenda (Two Day)

1. Preparation (Minimum 2 Hours Participation Required by Each VE Team Member)
 pre-study workshop preparation (during week prior to VE Study)

- Gather all documents (VETC)
- Prepare cost models (VETC)
- Prepare function analyses (VETC)
- Document review by each VE team member

2. VE/LCC Review Workshop (16 Hours Participation Required - All VE Team Members)

Day 1

- Orientation
- VE Team Leader distributes project workbooks and information, reviews scheduling, purpose & methodology of study with VE Team.
- Information Phase
- Project briefing by Owner/User representatives and Design Consultant's team members.
- Review of project documents, complete information phase by VE Team
- Creative Phase

- VE Team brainstorms alternative ways to improve function and value of project design and constructability; list all ideas.
- VE Team evaluates ideas for achieving improved value and identifies those to be developed into proposals for cost savings and LCC benefits.

Day 2

- Development Phase
- VE Team develops proposals for cost savings.
 Development consists of the following:
 - Description of the original design with sketches if considered necessary to support narrative.
 - Description of the proposed changes with sketches if considered necessary to support narrative.
 - List of advantages and disadvantages.
 - Cost estimate of both designs for comparison.
 - Information to allow a LCC Analysis to be performed (i.e.) energy, maintenance, reduced staffing, etc. that will improve the facility value long term.
- VE Team completes development of all proposals to be included in VE Review Report.
- Concentrate on completing narratives, sketches

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and supportive discussion sections (Cost and LCC can be added by VETC if not completed during workshop session).

Conclusion

- VE Team Leader collects all VE Proposals and team member worksheets required for the VE Review Report.
- VE Team members give short briefing of workshop results to designers and owner/users.

3. Assembly of VE Review Workshop Results

Day 3

- (VETC) And Others As Appropriate
- Preparation of presentation and report material (at workshop location)

4. Decision Making Meeting (Average 3 Hours Participation Required)

Day 4

- Presentation (time and location directed by Owner/User.
- VE Team Leader and Team members meet with Owner/User and Design Consultants to provide guidance to decision making process for acceptance and implementation of alternate design proposals into project

designs.

5. Post Study

- (Within 5 working days after VE Study and the Decision Making Meeting.
- VE Team Leader, Cost and Life Cycle Cost Analyst complete all proposals if necessary and prepare VE/LCC Review report for owner.
- Make 10 copies and send to Owner for distribution.

NOTES

Workday

8 a.m. - 5 p.m. (or to suit entire team)

Lunch and Breaks Midday and as appropriate

NOTE: It is customary to conduct a two day VE Workshop for the Project Schematic Design Phase submittal. This is usually followed with a one day VE Workshop for the Project Design Development Phase submittal. The format and agenda are very much the same except that the day 1 and 2 activities all occur on day 1 only.