

A WHITE PAPER ON VALUE ENGINEERING

Donald E. Parker, PE, CCE, CVS, FSAVE

Author

Mr. Parker is a graduate of Northwestern University with a BS in Civil Engineering, a registered engineer, a life Certified Value Specialist, Certified Cost Engineer, and SAVE Fellow. He is a recipient of the Lawrence D. Miles Award and serves as President of the Miles Value Foundation.

He was previously employed for 28 years with the Federal Government – U.S. Navy and GSA design and construction work. He served as staff value engineer for the Navy's Chesapeake Division, Naval Facilities Engineering Command and led the Command to receive the only VE Award ever given by the President of the United States, Lyndon B. Johnson in 1967. He was then promoted to start and direct GSA's first value management program.



He has been engaged for the past 22 years in consulting work and private sector commercial property development work including financing, acquisition, and property management.

He is author of the texts, *VE Theory*, and *Determining Building Worth*. He is the creator of the CD ROM, *Technology Templates* sold in the SAVE Bookstore.

Abstract

This paper is about his experience in establishing and directing the GSA (General Service Administration), PBS (Public Buildings Service) value management program and one of the major challenges he experienced in maintaining the program in a Government environment.

The paper answers the following questions: Why support VE above all other programs competing for resources? Why should it get special attention and treatment in an organization? The author answers these questions from a Government perspective where profit and increased sales are not necessarily the objective of the organization.

Prolog

I was privileged to start the first formal value management (VM) program in the General Service Administration (GSA) Public Buildings Service (PBS) in 1970 and operate it until about 1980 when I was reassigned to the Cost Management Division. During that period I experienced musical chair top management.

My original mentor was Arthur Sampson, an honorary SAVE Vice President who came to the agency, knew the benefits of VE, and wanted a program. He wanted to stress it as a value management program for management emphasis because the place was full of engineers. He left to become Acting Administrator after about 2 years and from then on I reported to about six different Commissioners and Acting Commissioners of PBS. Some of these had been to my VM Executive Seminars but some had not.

In 1977 a new Commissioner who knew nothing about VE or VM challenged me. He wanted to know why he should support the program when there were so many other competing programs in Government to save money. He asked, "What makes your program so special?" I asked him for a week to respond and ended up preparing the following white paper.

Basic Duty

I told him that a major part of the responsibilities of the Commissioner, PBS, is to "protect and conserve" the Federal resources entrusted by the people for use in their benefit. The question then follows, how much effort and resources is one willing to allocate to this function and under what mechanism(s) does one wish to manage this activity?

Current Mechanisms

The mechanisms available to managers to conserve and protect resources are many and varied. But basically, they can be put into two groups: static and dynamic.

The static mechanisms are devices built into the process of doing business as guidelines, regulations and laws. They should happen all the time and, of course, they do cost hidden resources to achieve their benefit. Some examples of static mechanisms intended to conserve and protect resources are:

- requirements for competition in procurement
- the Economy Act
- prospectus limitations

- personnel ceilings
- budget limitations

These mechanisms exist to assist management in preventing the big blunder. It is an approach whose costs and benefits of having are rarely calculated. However, recognizing they exist and that they are important, they are not the subjects of this paper.

It is the dynamic mechanisms for protecting and conserving resources that are the subject at hand. In GSA some of these dynamic mechanisms are programs, techniques and concepts such as:

- productivity
- work simplification
- management improvement
- energy conservation
- value management
- cost reduction
- paper work management
- life-cycle cost
- management by objectives
- management surveys
- employee suggestions
- presidential initiatives
- zero based budgeting

All compete for the resources of management. They are dynamic because their emphasis and utilization fluctuates with seasons of Government and power. They are dynamic because the level of their use by managers is limited by their understanding, experience, training, use, and preconceived notions concerning these mechanisms. They are dynamic because the level of their use by employees is limited by these same issues in addition to their perception of management's interest in them.

Operation Perceptions of Dynamic Mechanisms

Before discussing in more detail the selection of dynamic mechanisms for use in the PBS, one must address the perceptions PBS operating managers seem to have when it comes to allocating resources (i.e., ceiling, dollars, man hours) to these types of functions. Fairly, they wonder about operational priorities, how their job will be made easier, who will get the credit and what the credit is. Direct benefit to them is not apparent to them.

In the business world, the function of effort to protect and conserve resources is clear. It contributes to profit. And, managers can rationalize that what is good for the company, is good for them. In Government, the function and purpose of the expected effort is more subtle. It is to

improve the utilization of resources. Yet, the system is so designed to create apprehension regarding impact on resources and performance instead of motivation to perform:

| Action | Fear |
|-----------------------|---|
| Improve productivity | Ceiling will ultimately be reduced |
| Save money | Unobligated funds indicates poor performance |
| Encourage suggestions | Workload will increase |
| Encourage studies | Dilutes ability to perform operational responsibilities |
| Generate LCC ideas | Demands for limited money will increase |
| Identify problems | Reflection on job performance |

A most interesting statement taken from the joint GSA-FEA-OMB Energy Conservation Site Visit Report (Conservation-Paper Number 38 dated April 1976) reads:

“It is almost axiomatic that any effort or program is helped by top management interest. Human nature is such that most employee time and effort is directed toward those aspects of the job that are closely reviewed and about which management is concerned.”

With regard to energy conservation, the above report found that there was an attitude that the mission of the activity was the total and top priority and that conservation was only a secondary function.

Most managers do not perceive a direct "sense of duty" to assist in protecting and conserving resources. This happens because the effort required to protect and conserve resources is not treated as a task assignment equal in importance to other mission or operational priorities. And the focus of executive management is generally not on these issues.

Supporting this conclusion is the "Wilcock Survey" of the Society of American Value Engineers (SAVE), dated July 1976. Mr. James W. Wilcock, Chairman and Chief Executive of the Joy Manufacturing Company, in response to his request to assess the effectiveness of communications' between value engineers and their executive management, initiated the survey.

In his keynote address to the SAVE National Convention (Baltimore, 1975) Wilcock commented that executives, for the most part, do not support value engineering programs to the degree of commitment necessary for success. The survey found (1) that executive managers are (as a group) not interested in cost improvement, and (2) value engineers have been less than effective in creating a program to interest executive management in cost improvements. A partial summary of statistics from the survey follows:

GOAL ESTABLISHMENT

| | |
|--|-------|
| Established by Executive head | 11.9% |
| Established by program or line manager | 14.6% |
| Not clearly defined | 23.2% |

| | |
|--|-------|
| GOAL PERFORMANCE | |
| Responsibility of line groups | 4.9% |
| No directed goals | 27.7% |
| SUBMITTAL OF REPORTS | |
| To Executive management | 37.6% |
| No reports submitted | 24.2% |
| Written | 94.0% |
| Oral | 6.0% |
| EXECUTIVE INTEREST | |
| Active and involved | 28.6% |
| Interested but passive | 61.0% |
| Not involved | 10.4% |
| MISCELLANEOUS | |
| Programs considered highly successful | 27.9% |
| Presentation of planned program to Executive management | 26.7% |

The Necessity for Task Assignment

Misconceptions and oversimplification regarding many dynamic mechanisms prevail with adverse effect on their effective utilization. Here are a few of the more common misconceptions:

- improved productivity is achieved only by working harder or faster
- work simplification results only by cutting out steps in the process
- management improvement benefits cannot be calculated
- energy conservation is an artificial problem
- value management only works on problems
- cost reduction always means giving something up
- paperwork management is concerned only with reducing the amount of paperwork
- achieving LCC savings always requires higher first costs
- MBO requires commitments without resources management surveys result only in reports
- employee suggestions increase workload and stir up problems already known to management without the resources to cope with them

These misconceptions can all be corrected through education and application. First however, and regardless of the mechanism used to conserve and protect resources, it is important that the effort desired be a closely reviewed job responsibility. A good way to achieve this is to accept the task as an operational responsibility, commit resources to it, and manage those resources to ensure effective results.

Competing Programs

The common argument when one specific mechanism is pushed and promoted is that it is just another program being demanded when the organization is already burdened with many other worthwhile programs.

The dictionary defines a program as an “official edict or decree” and a “prearranged plan or course of proceedings.” To carry this one step further, the dictionary defines an official act as a formal, written act. And a prearranged plan is an arrangement of means or steps for the attainment of some objective which, when operational, has personnel assigned to accomplishing the tasks and an operating budget.

The PBS planning staff also relates the definition of program to include the elements of a defined effort, authorized, funded, identified outputs, and a unique collection of resources, policies and technologies to achieve a major responsibility inherent in the PBS mission.

An analysis shows, that of the above list of dynamic mechanisms, PBS has four "programs" with measurable workload - energy conservation, value management, employee suggestions and management surveys. These fully meet all of the elements of the definition of a program.

The other dynamic mechanisms do not, at this time, involve as high a level of activity in PBS as do the above four programs.

Picking a Program

From the above list of dynamic mechanisms to conserve and protect resources, if I had to pick just one as a program, I would pick value management. VM is a-planned effort directed at analyzing the functional requirements of:

systems, services, procedures, paperwork,
regulations, requirements, design, equipment,
supplies, facilities, and hardware

to achieve essential functions at the lowest total cost, consistent with required quality, performance, reliability, appearance, safety and operation.

The reasons for this choice are several:

1. It has universal application in all of the other dynamic mechanism areas. The objective of VM is to improve value. Improving value can be achieved by:
 - improving productivity
 - simplifying work
 - improving management
 - conserving energy
 - reducing cost

- reducing paperwork
 - improving LCC
 - achieving objectives economically
 - auditing for problems and performance
2. VM has the advantage of advocating or concentrating on no new techniques other than the relationship of cost and worth to function. It teaches and supports the utilization of the following existing techniques in application to the proper problem:
- MBO
 - Weighted evaluation
 - Flow charting
 - FAST diagramming
 - LCC
 - Economic analysis
 - Work simplification
 - Trade-off analysis
 - Breakeven analysis
 - Environmental impact
 - Cost estimating
 - Performance Indicators
 - FAST diagramming
 - Weighted evaluation
 - Standardization
 - Design-to-cost
 - Systems analysis
3. VM has a system of identification, study, approval, implementation and follow-up that can be taught and used by employees at all levels.
4. VM can improve worth and success rate of all GSA studies because of its applicability. Not only does the VM program provide a system (VM job plan) to ensure approved VM studies arrive at a definitive conclusion of implementation, VM also improves the quality of the study. It provides the added dimension of studying function and relating cost of function to the worth of functions. Studies that end in paper reports fail because they do not satisfy management. They define the problem wrong, study the wrong issue, arrive at unworkable solutions, fail to have all the information, fail to be creative, lack empathy for implementation, or fail to quantify benefits. VM studies specifically address each of these issues as part of the VM job plan. It might be noted that a VM study could be done to determine the function cost and worth of all of the dynamic mechanisms previously identified, if desired.
5. And last, PBS has already expended a lot of resources to have a VM program where it

has not done so in any other area. Let's build upon its strengths and correct its weaknesses.

Past PBS VM Performance

In the past five years, PBS has saved \$30 million dollars. Regardless of this, there is much room for improvement in program performance in terms of the untapped potential of the program, the uneven distribution of program effort between the offices and divisions, and the fluctuating attitude of line management towards the program. Our analysis takes each in turn:

First, the good:

1. Our return-on-investment (ROI) for what PBS has achieved has been acceptable:

| | |
|---------|---------|
| FY 1972 | \$ 3.84 |
| FY 1973 | \$ 4.53 |
| FY 1974 | \$12.85 |
| FY 1975 | \$ 4.48 |
| FY 1976 | \$18.09 |

2. We devised an accepted way to classify savings into “hard” and “impact” categories. Recurring impact savings are life cycle savings. Our savings record to date is:

| | Hard | Impact | Total |
|---------|----------|---------|----------|
| FY 1972 | \$1,408 | \$287 | \$1,695 |
| FY 1973 | \$1,197 | \$633 | \$1,830 |
| FY 1974 | \$2,164 | \$7,877 | \$10,041 |
| FY 1975 | \$2,924 | \$317 | \$3,241 |
| FY 1976 | \$12,385 | \$758 | \$13,143 |

3. PBS is the first and only agency to have a comprehensive VM program in the design phase of facilities under A-E contract. Other Federal agencies, state and local government, and private sector firms are beginning to follow our leadership.
4. Our contract value incentive clause has received wide praise from the General Accounting Office and many other sources for its simplicity, clarity and fairness.
5. The PBS processing time and approval percentage for contractor value change proposals is excellent:

| | | |
|---------|-----------|-----|
| FY 1972 | 37.7 days | 82% |
| FY 1973 | 28.6 days | 68% |
| FY 1974 | 43.9 days | 81% |
| FY 1975 | 62.2 days | 66% |
| FY 1976 | 39.0 days | 72% |

6. During the past five years we have trained more than 750 PBS employees in the techniques of VM through workshops. We have a good potential of resources to draw upon in conducting VM studies.

Next, areas for improvement:

1. Internal participation has never been adequate considering the number of regions below \$100,000 in savings:

| | Number of Regions by Amount Saved | | | | |
|---------|-----------------------------------|----------|----------|-------|---|
| | >500K | 200-500K | 100-200K | <100K | 0 |
| FY 1972 | | 2 | 1 | 4 | 3 |
| FY 1973 | | 1 | | 5 | 4 |
| FY 1974 | 2 | 3 | 1 | 2 | 2 |
| FY 1975 | 1 | 2 | 1 | 3 | 3 |
| FY 1976 | 5 | 1 | 1 | 1 | 2 |

2. The balance of participation between divisions needs improvement. Our judgment is that 95% of the savings achieved originated in the (PC) division, 5% from (PB). And, the majority of all savings since 1974 from (PC) are related to contractual services provided by our A-E's and CM's. Hence, many of our employees feel that VM applies only to design work and since new construction workload is down there is little opportunity for VM.
3. Contract incentive clause participation has fallen off and is unbalanced:

| | Number of Regions by No. of VCP's Received | | | | |
|---------|--|----|------|-----|---|
| | Total | >1 | 5-10 | 1-5 | 0 |
| FY 1972 | 44 | 1 | 0 | 4 | 5 |
| FY 1973 | 130 | 3 | 4 | 2 | 1 |
| FY 1974 | 48 | 2 | 2 | 5 | 1 |
| FY 1975 | 41 | 2 | 0 | 6 | 2 |
| FY 1976 | 36 | 0 | 4 | 3 | 3 |

The surge of participation in FY 1973 was caused by the purchase contract program. In FY 1972, one contractor on one project in Region 5 produced 31 of the 44 proposals. In FY 1973, a second contractor in Region 10 produced 35 of the 130 proposals.

The argument is given that, because of our design VM program with A-E's, our VCP potential should expect to falloff. This is the same as inferring we have perfect designs, economically ideal construction, and the most technologically advanced components. None of these is true when designing under the constraints of criteria, schedule, first cost and competitive procurement. Our judgment, based upon the large number and dollar volume of contracts we have and experience in DOD construction, is that our participation is only 10% of what it should be. We need more effort in aggressively marketing the clause with the spirit of making it work.

4. A GSA audit (21-4002-PCC dated December 17, 1974) of -the value program in Central Office and Regions 2, 3, 6, 7, and 10 confirmed the above and found in addition:
 - A need for an effective and progressive regional program by VM Board members
 - A need for higher priority assigned to the VM program by top regional officials
 - A need for more management direction in the motivation of PBS employees
 - A need for a greater effort to identify and publicize the benefits and rewards available to employees for approved VM proposals, and in conjunction with this, clarification as to when VM is job related

Statistics from this report read as follows (based on 85 employee interviews):

- 22% submitted VM suggestions
- No suggestions made outside of the VM training workshops were approved
- 62% stated that supervisors had not encouraged VM ideas and some directly discouraged participation
- 50% indicated that regional management does not give full support to the program

A substantial effort is still required in these areas.

5. The same GSA audit recommended that the PBS Commissioner take the necessary action to ensure that:
 - Specific regional VM objectives be established
 - VM objectives, accomplishments, and resources are incorporated in regional PBS performance reporting
 - The regions use all methods for identifying VM studies, including the systematic (or forced methods) as prescribed by the VM Handbook (PBS P 8000.1, par. 5-8)

Current Executive Management Policy

Line Management

For six years it has been our policy that the conduct and operation of the VM program be

delegated to Regional Commissioners and Assistant Commissioners (See par. 11, PBS 8050.1B). The extent of participation has been totally voluntary for internal application. The use of contract provisions has been the only exception to this. However, the level of marketing and aggressive use of contract participation has been voluntary. Some of the responsibilities assigned to these PBS senior executives with our comments are:

| <u>Responsibility</u> | <u>Comment</u> |
|---|---|
| • Maintain an effective VM program | VM Boards are not effective |
| • Achieve program objectives | Central Office has assigned no goals to regions. We have let regions volunteer to date. |
| • Conduct periodic management reviews of VM program | None have been conducted by line management. Internal audit conducted the one review mentioned above. |
| • . Budget and allocate resources to VM | No budget items for internal studies have been submitted for any FY budget. |
| • Initiate awards to recognize VM achievement | Only regions 3 and 4 have ever initiated awards. |

Operational Management

The policy for program operation is through regional VM Boards. GSA Order, PBS 8050.1B, sets forth the duties and intended responsibilities of regional VM Boards. A few of the more important functions of VM Boards for VM activities provided for by that order are:

- Approve planned effort
- Establish priorities
- Allocate resources
- Conduct resources
- Conduct hearings
- Approve changes
- Direct implementation

The intent of the order is to provide for the-direct involvement of line management in the management and conduct of regional VM activity. The VM Board is not intended to "plan studies" or "conduct studies," but rather to "make decisions." In addition to these general functions, Chapter 5 of GSA VM Handbook, PBS P 8000.1, provides a detailed set of VM Board responsibilities regarding their conduct in managing internal value studies.

The internal GSA 1974 audit portrayed the Boards as ineffective. The VM Boards either do not have the authority necessary to do the job desired or have not accepted their authority. In some cases, members of VM Boards do not appear to be true representatives of their Divisions; in that they are not empowered to commit resources or approve and direct changes on behalf of their Divisions.

During the six years of program operation there has not evolved a policy concerning approved levels of effort for internal VM study activity expected of regional offices. It was originally thought that any value study that showed a potential 10 to 1 ROI would provide appropriate levels of effort. However, when potential studies failed to be actively sought out or voluntarily submitted the level of effort dropped to zero. The method of case-by-case approval of VM studies from line management has been tried and has not worked.

Finally, VM Boards are all run on a collateral duty basis and consist largely of one branch manager from each regional division. VM Board chairmen have asked for a full time assistant to handle the day-to-day VM work in the region. Regional Commissioners have stated that if Central Office were serious about the program they would provide ceiling to support a position to manage the operation of regional VM activity. Paragraph 10 of PBS 8050.1B authorizes regions to provide a position and sets forth the duties. However, it does so without authorizing additional ceiling and makes it a regional option. Region 2 did have a full-time position for about 2 years until the incumbent died this spring. They have not taken action to fill it again.

Region 3 has two full time positions. However, one of these is the VM Board Chairman and he has no line management authority. He works as staff to the Regional Commissioner. The other works for buildings management. Region 3 has two VM Boards, a carryover from when the region was split.

Employee participation

On December 9, 1971, PBS 8030.1 was issued. It provided for employees to submit VM ideas in parallel with the suggestion program. In recent years the VM staff has attempted to provide more specific guidance to employees and regions regarding this issue.

On April 16, 1976, we received approval from the Administrator to experiment with improving the suggestion program through the IDEA Program concept. This will be implemented in early 1977.

Recommendations

All of our recommendations to improve the VM program are provided for in the proposed "Guidance for FY 1977 VM Activity" and its covering letter for the Commissioner's signature.

Epilogue

The white paper seemed effective because the guidance I prepared was signed by the Commissioner and was sent to the field. It worked for about a year until a new Commissioner came in and the guard changed again. I was fortunate during my term to have been able to hire three outstanding value specialists:

Arnold (Bud) Brogan – from Industry
Glenn Woodward – a Consultant
Dale Daucher – from NAVFAC

In 1974 Bud Brogan went to GSA's Federal Supply Service and started a VM program there. Dale Daucher took over the PBS program in 1980 when I was reassigned to the Cost Management Division. I retired in 1984 and the program continued until Dale left for private industry two years later.

The moral of this story - A Value program needs a champion to set goals, assign tasks, demand results and report benefits to management in order to survive. When it becomes everyone's job, then no-one does it because no-one is accountable!