

# 1993 SAVE PROCEEDINGS

## ELEMENTS OF SUCCESSFUL VALUE ENGINEERING PROGRAMS

This document was presented at the 1993 International Conference of the Society of American Value Engineers (SAVE) at Fort Lauderdale, Florida by Peter S. Megani, Martin Marietta. 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.

Peter S. Megani, is Group Manager of Value Engineering, Martin Marietta Electronics & Missiles Group. He is responsible for the organization, promotion, implementation, and operation of a comprehensive value engineering program including training and workshops at Martin Marietta and at major subcontractors in the United States and overseas. He has conducted 120 certified workshops and trained 1,500 people in the past eight years.

Mr. Megani has BS and MS degrees in Engineering. He was a member of the Board of Directors from 1978 to 1988 and President of SAVE from 1986 to 1988. He was the director of the CVS Certification Board from 1984 to 1986 and is Chairman of the Value Management Group, Electronics Industry Association.

### ABSTRACT

The key elements of a results-oriented VE program are outlined and discussed. Examples from the past 20 years are used to illustrate the benefits of VE with some emphasis on the success of the Martin Marietta Corporation over the past 8 years.

The specific topics covered in the paper are: management support versus involvement; leadership and goal setting; training and recognition; resolving people problems, and reporting followed by accounts of several success stories. The paper concludes with the delineation of essential elements of successful VE programs. Discriminators between successful and unsuccessful programs are discussed with examples.

### INTRODUCTION

Certain key elements must exist if Value Engineering (VE) programs are to succeed, whether in government, industry or elsewhere. To begin with, organizations must want VE for the benefits it can provide rather than to just fulfill some mandated requirement. Invariably, successful VE programs are found primarily in companies with both need and belief in the VE approach.

The attributes of results-oriented VE programs are:

- 1) Continued management support and involvement;
- 2) goal-oriented VE leadership;
- 3) realistic goal setting;
- 4) ongoing VE training;
- 5) recognition of well-performing personnel and suppliers
- 6) prompt resolution of people and supplier problems;
- 7) near-real-time VE performance reporting.

These attributes, discussed below, are from the perspective of a VE practitioner of more than 20 years who has observed both successful and unsuccessful VE programs. These observations are the essential discriminators between successful and unsuccessful programs.

### MANAGEMENT SUPPORT VERSUS INVOLVEMENT

From the management support viewpoint, a corporate VE policy must be generated, promulgated, and enforced. The issue is whether this is going to be just another policy or will it be enforced and motivate to "make it happen". The conclusion that must be imparted by the policy is that "VE will help me in the job and I will benefit monetarily and career-wise."

The message must be to individuals, not departments or some specialty organizations. Individuals make things happen, not departments or specialty organizations. Individuals must know how VE will help them first, and departments or specialty organizations later.

Management support must include funding and authorization to hire people; the right people, VE professionals, and not people who have been with the company for some 30 years and have nothing else to do. VE is a precise profession and

can not succeed with a "just use common sense" approach.

With regard to management involvement, it is absolutely not the same as management support. The Vice President for Technical Operations in Martin Marietta Electronics & Missiles Group is an extremely busy individual. Yet, this individual always makes it a point to visit VE workshops that are in process, sit in the back of the conference room, and listen. Workshop participants know the Vice President is there and know about the busy schedule of this corporate executive. Their conclusion is obvious. VE is important to the company and it better be important to them. Funding for the workshop stems from management support, but it is the foregoing kind of action that signifies management involvement.

### LEADERSHIP AND GOAL SETTING

The key question is who is going to lead the VE program. Must the person have an engineering degree or, for that matter, any degree at all? No, degrees are not necessary. What is important is for the leader to be people oriented. The most important trait of an effective leader is enthusiasm.

The leader must be able to get along with people and, in return, must be liked and respected by others. This individual must know the VE methodology and, above all, must understand the functional side of the company and how powerful it is.

The leader must like and believe in VE and pass these feelings on to people, from the Chief Executive Officer to hourly workers. The leader must be persuasive and a super sales person constantly selling VE and the company's VE goals.

With regard to goal setting, a basic tenet of VE is that goals which are selected should be realizable. Goals should be difficult but achievable so that they do not lose their realism and credibility. How does one set goals such that people will strive to meet them and at times surpass them? What rationale should one use in setting goals?

The U.S. Army Materiel Command, forexample, selects goals that match the rate of inflation. Another rationale used is to select goals that match the rate of inflation. Another rationale used is to select goals that match the increased cost of doing business that year. The issue, however, is what particular aspect of the company's business should be addressed by the VE team?

It is important to know what management wants before deciding on candidate VE projects. It is a case of what is management's problem or, putting it another way, what do they think their problem is. Is it cost, quality, reliability, personnel turnover, lack of sales, lack of sufficient profit, shrinking market, or loss of money? When answers to such questions are known, Pareto analysis is used to glean the *vital few* from the *trivial many* for VE analysis.

The uppermost thing to do is to institutionalize VE so that it becomes part of the fabric of the company. VE must be a way of doing business and not a nice thing to have when the company is financially sound. Remember, companies need VE more in difficult financial straits than when in sound financial positions.

### TRAINING AND RECOGNITION

It is important to start training with top management, that is

## 1993 SAVE PROCEEDINGS

vice presidents, directors, and the president's staff. Training should be based on actual VE projects on real problems. These people should be exposed to actual job plans and FAST diagramming, team formation, and sufficient brainstorming to see that VE really works.

Next, the training is extended to middle management, the people who do the work. This is the most difficult group of people to train because they are so busy, but they must be sold on the benefits of VE to themselves, let alone the company.

Then, VE awareness sessions are conducted for all employees of the company. These sessions may last a day or less, but they must be made to understand what VE is, along with the message that both top management and middle management expect them to use VE in everything they do.

The training must teach *team dynamics*, that is how to work as a team and the power of a team. The importance of completing one job rather than starting 10 and completing none is stressed. This is not an easy task.

Western culture teaches people to be individualistic and self starters. Now the emphasis is on the *how* and *why* of working as a team. The question of rewards and personal recognition arises in working as a team. Continuous motivation of people is necessary in VE.

VE workshops are major training vehicles as well as the primary tool of VE. It is essential to hold workshops on a continuing basis, be they five-day SAVE certified workshops or three-day or one-day workshops using live projects, addressing real problems, and making continuous improvement thanks to the technical advantages of new technology.

With respect to recognition, all people want and need recognition especially if one expects them to embrace VE and be *idea makers*. They must be given *kudos* from some type of awards program based on money or prizes and, above all, public recognition. The intent is to reward the *idea makers* and supporters of the VE Program.

The importance of cash awards should not be overlooked. People thrive on recognition but they work for money. At Martin Marietta, the policy is to reward the originator of an approved value engineering change proposal (VECP) with a sum of money equal to the company's share of the VE savings raised to the two-thirds power with taxes prepaid.

On \$1-million award to the company, the equation yields the sum of \$10-thousand to the originator of the VECP. This is indeed motivation. In addition, originators and guests are invited to the Annual Awards Banquet where they are again recognized.

Most companies buy fifty percent or more of what they sell from suppliers who are either subcontractors or vendors. It is important to train these people in VE methodology to insure the most competitiveness. The best place to begin with suppliers is in the proposal phase. Martin Marietta has conducted supplier workshops that have reduced proposed supplier selling prices as much as 22 percent.

On the other hand, it is essential that suppliers receive recognition as freely as the company's employees. In general, the sharing provision between the government and the company should be extended to the suppliers.

### RESOLVING PEOPLE PROBLEMS

One must know and accept the fact that people do not want to change. They are comfortable and feel safe in doing the same thing for past 20 or more years. Therefore, change must be forced on these people. But, how do you change people's perceptions? No one can give you a simple formula because it is not a simple matter to contend with.

All situations are different just as all people are different. However, here are examples that may serve as role models. In the first instance, a program director had the value specialist establish a *should-cost* for each part in the system. If the cost of a procured part exceeded the *should-cost* by 10 percent, the buyer would need to notify either the program director or the VE

specialist. The program came in on the *should-cost* target.

In another instance, a design manager asked the VE specialist to conduct a VE task team study on a certain design. The creator of the design complained that if anyone touched the design, it might not work anymore. The answer to that was if the design is so marginal then no one would want to touch it. Two weeks later, the designer came forth and said the design is good and a VE task study should be done on it.

The situation turned out well in both instances requiring the utmost patience, fortitude, and tact. It is important to handle people problems on a case-by-case basis.

### REPORTING

No job is complete until the paperwork is done. This is especially true in VE wherein documentation must be both realistic and credible. Realism ensures that the job is done right. Credibility convinces management that the right job is being done.

Management should be kept apprised continuously of status and progress on VE programs. Remember, VE must be sold continuously to all people in the company, top and middle management, department heads, group engineers, staff members, and hourly workers.

Be careful in your claims of success. Be sure these claims are well documented with particular emphasis on such things as basis of estimates. This particularly true with customers who require detailed documentation in the approval process.

Company newspapers should carry reports of VE progress and accomplishments, with particular emphasis on awards and recognition of people and suppliers. VE must be sold over and over again. One must accept the fact that this is an ongoing effort.

### SUCCESS STORIES

The following tables give insight into the monetary benefits of a results-oriented VE program. Table 1 gives data on a typical (VECP) prepared by Martin Marietta and approved for implementation by the customer, the Advanced Attack Helicopter Program Office, in 1989.

Table 1 Typical VECP

Use hard carbon coating on IR window of TADS/PNVS.

- 40 percent improvement in transmission of IR energy.
- Improved reliability and reduced maintenance.
- Savings from reduction in number of spares: 12.7-million

Table 2 gives data on a more substantial VECP in terms of the dollar magnitude. The program was the PATRIOT air defense missile and the VECP proposed the replacement of the silver-zinc battery in the missile with a thermal battery. The table summarizes the benefits of the change. Note the return on investment to the government was greater than 53 to 1.

Table 2 More Substantial VECP

- Change PATRIOT battery from silver-zinc to Thermal battery.
- Replacement interval: 7 years to more than 20 years
- Battery capacity: 2.9 ampere-hours to 3.8 ampere-hours
- Battery unit price: \$4,200 to \$3,800
- 20-year life cycle cost: \$152-million to \$15-million
- Implementation cost: \$2.5-million

## 1993 SAVE PROCEEDINGS

- Savings to government: \$134.5-million
- Return on investment: 53.8 to 1

Table 3. underscores the value of VE as an investment. The data reflect the performance of the VE Department at Martin Marietta over the past 8 years. Note that the return on investment to the company during this interval of time is 22 to 1.

Table 3 VE As An Investment

- Eight-year savings to Martin Marietta customers: \$1-billion
- Eight-year profit to Martin Marietta: \$29-million
- Return on investment to Martin Marietta: 22 to 1

Table 4 describes the VECP that has gone down in the annals of VE as the *classic VECP*. In 1982, Hughes Aircraft submitted a VECP to the MAVERICK Program Office in the Air Systems Command at Wright-Paterson Air Force Base. The VECP proposed the replacement of discrete components in the missiles with integrated circuits. In essence, the state-of the art at the time when the missile was designed would be replaced with newer technology at substantial cost savings.

Table 4 The Classic VECP

- Incorporation of new technology in MAVERICK missiles. Submitted in 1982 by Hughes Aircraft.
- Approved in 1984 by the MAVERICK Program Office, ASC, WPAFB.  
Total savings: \$172- million.

The VECP was approved by the Air Force in 1984. The award to Hughes Aircraft was \$40-million. This record has yet to be surpassed.

### SUMMARY AND CONCLUSION

This paper addresses the discriminators between successful and unsuccessful VE programs in the areas of management commitment versus involvement, leadership and goal setting, training and recognition, and resolving people problems.

The monetary benefit of successful VE programs is illustrated with details on a typical VECP which was approved for implementation by the customer, VE history at Martin Marietta, and the classic VECP of all VECPs that was submitted by Hughes Aircraft in 1982 and approved for implementation by the customer in 1984.

The conclusion that successful VE programs share certain attributes. These are called *elements of successful VE programs* and are listed in the Table 5.

Table 5 Elements of Successful VE Program

- Management support, involvement, and commitment.
- Adequately staffed VE organization.
- Written VE policies and procedures.
- Specific VE objectives.
- Regular management review of progress.
- Training in VE techniques.
- Suppliers involvement.

- Clear understanding of FAR VE provisions.
- Receptive customer attitude.
- Recognition and motivation of personnel and suppliers.