Improving Profits Through Prime/Subcontractor Value Engineering (NEW)

by K.R. Thorson and R. Snidar, June 1984 (Soft Cover) ........

This 37 page manual provides guidelines, examples and case histories on how prime and subcontractors involved in any type of U.S. federal acquisition contract can optimize profitability by fully utilizing the Value Engineering Incentive clause. The manual specifically deals with the methods and procedures through which subcontractor can take advantage of the VE Incentive clause and provide benefits for himself, the prime contractor and the Federal Government. A must for everyone involved in contracting with U.S. Government, if they want to improve their profits.

The Negotiation & Settlement of Approved VECPs

For use with DAC #76-39, 20 Oct. 1982 (Soft Cover) ...........

The purpose of this document is to provide to Government contractors and their suppliers, who are relatively new to the field of Value Engineering proposals, assistance with management, negotiation and settlement of VECPs. Additionally, the sequential coverage of the subject herein is intended to help reduce the submittal of incomplete or poorly substantiated negotiation data which could lead to loss of all or a portion of the Contractor's share of the savings resulting from an approved change. In short, this document will attempt to explain what must take place after a VECP has been adopted in order to get paid.

V.E. in Construction Industry

by A. J. Dell'Isola, 1973 (Hard Cover) ......................

Presents a proven, organized approach to reduce cost of ownership of construction projects—educational facilities, hospitals, offices, apartments, laboratories. Applicable to public works projects — roads, sewage treatment plants, transportation systems, dams.

Value Analysis in Design and Construction

by James J. O'Brien (Hard Cover) ......................

A realistic no-nonsense guide to the enormous time and money saving opportunities made possible by applying VA throughout the entire cycle of any construction project.


Hard Bound Edition ...................... $27.00 $41.50

"Discover the Gold in Value Engineering" — 28 papers from 34 authors covering Industry, Government, Technique, Construction, Philosophy and Value Engineering Workshop.
Contents

4 Searching for Excellence  
by Tom Peters and Perry Pascarella

6 Time Is What We Have Plenty Of  
by Carlos Fallon

7 Conjoint Analysis Can Supply Better Market Information to  
Value Analyze New Products or Services  
by Giacomo D'Ascanio

12 Productivity in the U.S.  
by J.J. Kaufman

14 The Role of Value Analysis in a Financially Distressed Company  
by D.E.A. Tannenberg

17 Remarks of Leo J. Trombatore at the SAVE Conference  
by Leo J. Trombatore

19 Basic Point Method and Optimum Value Zone  
by Gu Sin-yi

21 The Electrical Engineer on the VE Team  
by Herbert Peters

30 Thunder  
by T. R. King

EDITORIAL POLICY: To provide informative, timely and interesting communications pertaining to Value Engineering/Value Analysis and related disciplines. VALUE WORLD enables contributors to express themselves professionally in advancing the art. VALUE WORLD is dedicated to the establishment of a mutual bond among those seeking to better the quality of working life and establish a communications network through which participants can interact for mutual benefit.

The views expressed in VALUE WORLD are neither approved nor disapproved by the Society. They are the expressions of the author(s). All papers have been edited — frequently condensed — by the editor.

VALUE WORLD is published quarterly on approximately the 15th of March, June, September and December, and is distributed internationally.
SEARCHING FOR EXCELLENCE
THE WINNERS DELIVER ON VALUE

By Tom Peters and Perry Pascarella

To the Value World Reader:

A few years ago, people recognized VE only as a splendid means of reducing product cost. Later it became understood that it was an excellent way to reduce process cost. Today we are using VE to analyze and improve performance dependability. How much further can VE take us?

The following article suggests the next step for VE. Tom Peters and Perry Pascarella explain that the real value in a product must be measured by that which it brings to the employee and to the managers, as well as that which it brings to the customer. The article makes no mention of value engineering; but can you, or anyone who is versed in VE, read this article without anticipating that this is the next arena for VE?

John A. Jonelis, SAVE President

Reprinted with permission of Industry Week

Some people think that anybody can deliver quality, and that quality is therefore not an important basis for competitiveness. As an intellectual proposition, that's correct. But the harsh reality is that in any market there's never more than one or two people who deliver superior product quality and service. It's ridiculous. It's insane. But that's the real world.

A look at 70 strong companies shows the importance of working on the top line — total revenues — rather than strictly on the "bottom line." Fully 65 were driven by revenue-enhancement activities with a principal focus on quality, service, reliability, and niche-manship. Only five of the companies were driven by the singular mind-set of being the low-cost producer — or else. Interestingly, four of these five got into very serious trouble during the recession.

A recent study done by McKinsey & Co. for the American Business Conference examined 45 superstars among the fast-growing mid-size companies that have between $25 million and $1 billion in sales. The principal conclusion: Winners almost always compete by delivering a product that supplies superior value to customers, rather than one that costs less. These companies compete, not on low cost, but on the value of the product and service. And they frequently enjoy premium prices.

This is not to denigrate the role of cost-competitiveness. But, as a fellow who manages 20,000 people at IBM Corp. said: "There's a huge difference between cost-competitive and low-cost. I've never known an institution with a low-cost attitude that was a winner over the long haul."

It's an absolute necessity to control cost, but you can't do everything perfectly. Too many chief executive officers set corporate goals of being the highest in value added, lowest in cost, and the most innovative in every market in which they participate. There's not an institution in the world that has the capability to walk and chew gum simultaneously. The managerial pie is only 360 degrees, and if 348 of those degrees are aimed at paper-clip counting, you're not going to be paying attention to quality, service, and the next generation of products.

There is a misleading notion that a lot of people buy solely on the basis of price. That is untrue in virtually any industry. There need not be any such thing as a commodity. In fact, "commodity" may be the dirtiest word in the English language. You call your product a commodity, you talk about it as a commodity, and you'll start treating it like a commodity.

CLOSE SHAVE

The most exciting institutions are those headed by people who are excited about their product — Frank Perdue of Perdue Farms, the late Ray Kroc of McDonald's, Bill Marriott, Sr., Paul Smucker, Herman Lay, Forrest Mars, and others like them who would never have made it through the first day of a policy class in a graduate school of business.

Frank Perdue talks, lives, sleeps, breathes, and eats chicken. And he does it in ways that are symbolic. He has, for example, spent a quarter of a million dollars on a dryer to stiffen the hairs on chicken wings — so he can subsequently burn them off — because he hates the hairs on the finished product. He has battled down...
to the last two hairs; he’s not there yet — and he’s not happy. He thinks there is absolutely no limit to the quality that can be achieved on a 25-cent-a-pound wholesale product.

Frank tells of a recently hired M.B.A. who keeps asking him: “Frank, is or is not our chicken already the best?” He keeps replying: “That’s not a question I ever want to hear. The only issue in this company is, ‘Can or cannot our chicken be better?'”

You don’t have to have a direct competitor to do your best. You are your own competitor. Even companies that do not have a direct competitor in the market can set high standards — standards that are continually moving higher and higher.

You can have any market you want if you will simply be courteous to your customers, because you’ll be so damn different from the rest of the lot.

Quality is about 99.8% state of mind. It’s attention to “trivia” and the presence of persistence — not magic — that lead to excellence. It’s Ray Kroc saying, “You’ve got to be able to see the beauty in a hamburger bun.”

The manager has got to love his product or service. And he has got to really love the people who make it.

WHO MAKES THE DIFFERENCE?

You can have any market you want if you will simply be courteous to your customers, because you’ll be so damn different from the rest of the lot.

The issues, then, are customer courtesy, product quality, customer service, regular innovation, and regular experimentation. And the providers of these things are all the people in the organization — not just a select few.

The special distinguishing trait of an effective manager is his or her relationship with employees, product, and customers. If you expect your people to treat your customers with courtesy, you have to treat your people with courtesy. A manager must have a bone-deep belief in the value, worth, and potential creativity of every individual human being in the organization. There is no way in the world that you can separate quality of worklife from the quality of management.

Quality begins with self-respect, which enables people to respect others in the organization and those whom the organization serves.

Autocratic management can control-out a great deal of people’s bad behavior, but it cannot control-in all of the infinite details that make for quality work. That can come only from committed, competent people who are constantly searching for ways to do their jobs better.

Managers like to think of themselves as agents of change — as people who manage change. But they fool only themselves if they think their systems and controls can bring positive change. Leaders, however, empower people, giving them the resources and environment in which they can find the route to change and improvement.

A powerful leader points the way to the infinite — toward excellence which continually moves upward — and causes people to continually raise their standards, using attained objectives as the springboard to still greater excellence.
"Not ending a sentence with a preposition is a superstition up with which I will not put," said Winston Churchill. In fact, the word preposition itself means that it should come first in Latin, not in English. So in English we are free to say, "Time is what we have plenty of."

Time for what?

We have time for all kinds of peaceful, political, social and economic experiments — experiments that aim at continuing control of our environment to meet our needs. You might ask why control is so important. Try asking beavers. Do beavers allow their ponds to dry up? No. They work at controlling their environment, just as we do. Intelligent life depends on control of the environment for its survival.

In recent years, I have come to the conclusion that effective control over our environment depends much more upon cooperation than upon competition. Indeed, our survival as a species may require cooperation. There is evidence that American management may be beginning to learn that cooperation means success. We see it in lessons from the best run corporations in America, and from our current fascination with the Japanese — a society that counts on cooperation to produce goods, services, and innovation. Perhaps a miracle is happening before our very eyes: a world-wide change from hostility and strife towards working together.

I envision a world where cooperation and gentleness instead of anger and toughness can be today's and tomorrow's management guides. The effectiveness of friendly, nonargumentative discussion at first surprises the players in a participative management team. Then the results actually delight them. It is fun to do anything better. Improvement is self-rewarding.

There is evidence that American management may be beginning to learn that cooperation means success.

It is fun to do anything better. Improvement is self-rewarding.

Long after our experiments on earth have succeeded or failed, the sun will still be shining. That is why in English we can say, "Time is what we have plenty of."

I am writing from the World's Fair in New Orleans. I had a very worthwhile trip, celebrating here the fiftieth anniversary of my marriage with the beautiful woman who spoils me and teaches me the value of cooperation.

I remembered today that the Battle of New Orleans, fought after the peace treaty had already been signed in Belgium, was the most significant battle fought during that period. It marked the beginning of the nineteenth century in military history.

What was so significant?

It was the emergence of U.S. technology through rifles. The British well-trained regulars, armed with their smooth-bore muskets were stopped dead by rifles. It was the first evidence that Americans had developed their own technology. Cooperating pioneers, armed with rifles, had put an end to the musket-armed military machine of the eighteenth century. Today all armies use rifles. The smooth-bore musket is a thing of the past. The first step of modern U.S. technology — the rifle — first appeared at the Battle of New Orleans.
Conjoint Analysis Can Supply Better Market Information to Value Analyze New Products or Services

By Giacomo D'Ascanio

Giacomo d'Ascanio graduated from the University of Pisa with a Dr. Ing. Degree in Industrial Engineering in 1946. He works in mechanical design at the school of his father Corradino, designer of the first stable helicopter in the world (1930), and of Vespa motorscooter.

Since 1972, as Professor of Value Analysis at the University of Pisa, he has been teaching the first VA graduate course in Italy. At present he follows two lines of research: Social Value Analysis against Unemployment and VA applied to Research in the Oncology field. He is a member of SAVE, the British Institute of Value Management and the American Marketing Association.

The design of a new product or service requires specific quantitative market information that can be wholly supplied by Conjoint Analysis, but only partially by other market analysis techniques. This paper describes the underlying concepts, results, and latest developments of this new method, made possible by the use of computers.

Introduction

All firms are compelled by scientific and technological progress to make continual changes, often launching completely new products or services on to the market. The risks connected with innovation are high, as is also the death-rate among new ventures.¹

The best way to reduce this risk is to obtain more precise information. One of the prime causes of success is a detailed knowledge of every critical aspect of the judgement that the market will make on the new product or service.²

In the design phase of any product or service, choices must continually be made between alternatives. The costs of these various alternatives may be obtained, albeit with some difficulty, fairly rapidly by the Design Department. In its most up-to-date form, for typical structures, this is done by statistical techniques of computerized calculation, based on historical costs of previous projects.³

One factor, however, which is not usually known to the Design Department is the value that the market will give to the new forms in which the product or service under study is presented, each of which includes more or less sweeping changes in the composition of its main attributes. In these circumstances, every decision becomes a question of opinion and is exposed to a high degree of risk. Furthermore, the new presentation may be sufficiently appreciated by certain segments of the market, but not by others. For this reason, it is necessary to know the size of the various segments, both those that are interested and those that are not, before making any decision.

These facts are not usually known to the Design Department, nor even to the Marketing Department, and they are precisely what Conjoint Analysis can provide.

This is also the reason why the Marketing Department often plays a limited role in the definition of many new products.

Many "quantitative" marketing studies are based on approaches which are not appropriate for the identification and quantification of customer wants or needs. Studies have often relied on the rating of product attributes which, although simple, can lead to biased responses — the desire to have all attributes.⁴

"Qualitative" marketing research studies do provide some insight into consumer wants and needs. Yet, given the small and unrepresentative samples on which they are based, there has been some understandable and justifiable reluctance to use their recommendations as guidelines for specific decisions.

Conjoint Analysis fills in all these gaps, and supplies, with a sufficient degree of reliability, precisely those data that the Design Department needs.

Conjoint Analysis

Conjoint Analysis belongs to that group of somewhat complicated, sophisticated techniques known as multivariate procedures, which have been increasingly used in market research. Multivariate procedures can assess complex interrelationships among variables more efficiently than simpler procedures such as cross-tabulations. This is especially important when a key variable [e.g. sales] is assumed to depend on several other variables simultaneously. This important step forward has been made easy and relatively cheap by canned computer programs.

Conjoint Analysis, like Multidimensional Scaling (MDS), is based on the presupposition that an individual's overall evaluation of a product or service can be explained by the position that it occupies with regard to a certain number of variables that characterize
it, known as “attributes.” In Fig. 1, we can see the position of product A, a utility car and that of product B, a high-class car, with regard to two chosen attributes: price and horse-power.

While MDS tends to discover the geometrical model employed by the user in his evaluations, that is to say the attributes that he considers, Conjoint Analysis works on the assumption that these attributes, or fundamental choice factors, are known, and calculates rather the utility functions of the single attributes. The overall evaluation of the product will thus be the sum (or product) of the utility values attributed to its level for each of its various attributes.

Figs. 2 and 3 show two examples of utility functions referring to the attributes of price and horse-power. In this specific case, the utility derived by the user for both attributes decreases sharply in proportion to the increase in the so-called grade of realization, or level. In this way, after considering all the forms of the new product or service that are technically possible and the costs, the Design Department also will possess the elements, i.e. the utility functions, that are necessary to arrive at the optimal solution.

The two graphs also reveal that one of the attributes, in this case the low price of the product, is more highly appreciated than its horse-power, since the respective increases in utility are 0.7 and 0.3. In such cases, which are very common, it may well be convenient to try to potentiate the attribute for which a preference is shown, i.e. try to pass from level 1 of price coupled with level 3 of horse-power, to level 3 of price coupled with level 1 of horse-power.

The procedure to obtain from the market the input data to feed into the computer is different from the so-called self-explicated, compositional utility models, in that the sample of potential users of the new product or service is not directly invited to express a judgement on the utility of each attribute, in connection with each of the levels on which these attributes may be found. The procedure is much closer to what actually happens: a series of alternative products or services are directly presented for evaluation, leaving the job of working out the utility functions of the single attributes to the computer [decompositional models]. These alternatives may be presented in the form of verbal descriptions, pictures, product prototypes or in any other form that is considered to be suitable. Each alternative actually represents a mixture of various attributes, each of which is realized on a different level.

The respondents are asked to examine the set of combinations and rank or rate them on the basis of a selected dependent variable. Since each stimulus is a combination of attributes, the rating or ranking of combinations reflects the consumers' trade-offs among conflicting product attributes. The computer will then derive the utility function from the ranking of preferences [Fig. 4].

The computer works out the utility functions for each person interviewed, so it will be easy to carry out, by cluster analysis programs, market segmentations based on socio-demographic, geographical, or psychological variables, etc., as shown in Fig. 5.

Since the alternatives are essentially factorial combinations of the attributes, the number of possible alternatives quickly gets out of hand. This has led researchers like Green to resort to using orthogonal subsets of the possible alternatives. As long as there is no complex interaction effect, this approach works quite well.

It is advisable, however, to limit the number of attributes, as individuals have difficulty in evaluating objects defined on more than six attributes at a time because of information overload. The method most commonly used to work out the utility functions is the MONANOVA, but many other programs are available: PREFMAP, LINMAP, Monotone Regression, Regression/ANOVA, LOGIT Analysis, the pairwise trade-off matrix approach of Johnson and others.

When there is a high degree of interaction among the various attributes and it is not desirable to place undue strain on the data-supplying possibilities of the respondent, it is convenient to use the so-called hybrid models, which combine the simplicity of compositional models with a greater degree of realism and
Commercial Applications of CA

At present, the use of Conjoint Analysis appears to be fairly widespread in the United States, even though it is not yet universally accepted. A study carried out by Cattin and Wittink\textsuperscript{10} show that the first commercial study based on Conjoint Analysis in the States was completed in 1971, and that in the following decade, about a thousand studies were carried out, with an increase from an average of 70 studies per year to 160 studies in 1981.

<table>
<thead>
<tr>
<th>ATTRIBUTE II</th>
<th>LEVEL 1</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>LEVEL 1</td>
<td>12</td>
<td>10</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>LEVEL 2</td>
<td>11</td>
<td>9</td>
<td>5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>LEVEL 3</td>
<td>8</td>
<td>7</td>
<td>4</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

**Fig. 4 - Preference ranking input data**

The most frequent application of this method was for consumer goods (61%), followed by industrial goods (20%), and then transportation, financial, government and other services. The specific purpose of most of the research was new product or service identification and evaluation. Conjoint Analysis has been widely used to determine the shares of the market acquired by various competing products, including our own, together with various price hypotheses (see also Straube & Michaud\textsuperscript{19}).

One advantage of Conjoint Analysis is the possibility of obtaining information about the influence of an attribute on preference, e.g. the price, even when the existing items available on the market do not vary on the attribute. It has also been used in market segmentation and in advertising.

The problem is essentially simple: after discovering the utility that the market attributes to a particular brand on the basis of the attributes that characterize it, if it were possible to know the costs as well, it would also be possible to maximize the objective function (total number of test brand first choices, average possibility of choosing the test brand, total expected profits or total expected cash flow, etc.)

In reality, the course of costs for physical structures or complex organizational systems is unforeseeable. Sometimes, a reduction or the abolition of an attribute that is not very highly appreciated by the market, may have fundamental repercussions on costs. Just as there are often marked, but known interrelationship effects between attributes that determine value, so there are often marked, but unknown effects between them that influence the calculation of the total cost. This is partly due to the continuous evolution of technology. The
existence of a particular technology is often only discovered at the moment when a structure is designed, as a result of a detailed study of the specific problem.

Furthermore, the limits of feasibility of the system studied are normally unknown as well, in the sense that not all the different compositions of attributes are possible in a new product or service.

The first people to formalize the problem of optimal product design in a market-oriented context were Shocker & Srinivasan and I. Both, with a different approach, refer, when speaking of a simplified model of the market, to a multidimensional space with real points (existing products) and ideal points (hypothetical products), and suggest some possible solution strategies, including gradient search, without presenting any specific algorithm.

The most complete and refined approach to Product Design Optimization by Conjoint Analysis, which is at the same time an organic collection of Conjoint Analysis computer programs, is the POSSE system (Product Optimization and Selected Segment Evaluation), devised by Green, Carrol & Goldberg. Paul E. Green, Professor of Marketing at the University of Pennsylvania, is a pioneer of Conjoint Analysis; the system can be hired by telephone.

It may be useful to give a brief description of this system, to illustrate how far Conjoint Analysis has developed.

The POSSE system consists of 28 computer programs. These programs can be classified under eight main headings.

1 — Experimental Design Programs

The POSSE methodology uses various kinds of fractional factorial designs. In most POSSE applications, respondents receive only four to nine product profiles; the profiles are usually selected so that attribute levels are balanced. The three programs that are employed in this phase of POSSE are DESIGN, ORTHOTEST, and LABEL.

2 — Utility Function Estimation Programs

POSSE contains a variety of programs for estimating either individual or subgroup utility functions. The programs cover the gamut from dummy-variable regression to hybrid models. The programs for this phase are STEPWISE, MONREG, HYBRID, THRESH and TWOWAY. In most of the recent POSSE applications, some type of hybrid utility model has been employed so as to reduce respondent time and effort, while permitting selected interactions to be measured at the subgroup level.

3 — Choice Simulators

POSSE employs four different simulation programs to compute shares of choices under different test product descriptions. The simulators (CHOSIM, BTLSIM, DUESIM and TABSIM) exhibit the common objective of computing the share of choices received by a specific test product in the context of one or more control products. All four programs can handle up to 40 attributes, with up to nine levels of each attribute, and simulations of up to 10 products per run. The simulation programs are for up to 1,000 respondents, but can easily be redimensionalized upwards. In short, all four simulation programs can handle large-scale problems, if necessary.

4 — Response Surface and Objective Function Estimation Programs

The two programs that constitute this module of the POSSE series are DUEALL and STEPWISE. DUEALL is a deterministic choice simulator that quickly allows the researcher to compute the effect on the share of choices due to a specific new product profile. DUEALL is also modifiable (by appropriate subroutines) to handle objective functions, other than share of first choices. After DUEALL has found the appropriate values of the objective (value for each new product profile simulation), STEPWISE is applied to model the objective function (to derive the Response Surface).

5 — Categorical Optimization Programs

QUALO, QUALIN, and QUALOM are the programs to optimize response functions whose arguments consist of categorical variables.

6 — Polynomial Optimization

In many applications of POSSE, the attributes will be composed of underlying continuous variables. If such is the case, the user might wish to optimize some polynomial function of these variables, under linear constraints. All of the programs in this set, QUADMO, MOGUL, INDEF, HILL, BOX, and RANDO, can handle up to 40 independent variables, with up to 80 upper and lower range constraints.

7 — Sensitivity Analysis

After an optimum is found by some program(s) in the POSSE series, the researcher may wish to explore the nature of the response “surface” around the optimum. Four programs (TOLCO Q, RIDGE, TOLCO K) are available for this.

8 — Time Path Forecasting

SWITCH is the program for time path projections of market share, that is based on a first order Markov brand-switching process.

Conclusions

The design phase of every new product or service consists of patiently creating alternatives and choosing between them. This choice is based on the knowledge of the value that the market will give to the various attributes of the product and to their interrelations, and the comparison with the total production cost. This procedure should subsequently be applied at lower levels, until we arrive at the elementary components.

Normal market analysis techniques do not succeed in supplying the Design Department with those quantitative data that are necessary during this choice phase, as Conjoint Analysis does, but only before or after the completion of the project.

For this reason, Conjoint Analysis, which has been made possible by the use of computers, is to be considered as the most powerful tool supplied by Market Analysis in recent years for the Design Phase of New Products or Services.
Footnotes

Productivity in the U.S.
What Role Value Engineering?

By J. J. Kaufman

J. Jerry Kaufman, CVS, is a consultant on VE management with 25 years experience in the industry. He is a past president of SAVE and is National Director of the Certification Board.

Productivity and the weather have at least one thing in common. Everybody in the U.S. is talking about them, but few are doing anything to change them — until now.

In the last few years, new corporate titles have emerged — "Vice President of Productivity," "Director of Productivity Improvement," "Productivity Manager," etc. — all in an attempt to improve the productivity of companies and industries. These individuals charged with the responsibility are finding the same problems that have plagued value managers for years:

**Measurement**

\[
\text{Productivity} = \frac{\text{Output}}{\text{Input}} \quad \text{Value} = \frac{\text{Function}}{\text{Cost}}
\]

Beyond these equations, both the productivity managers and value managers find it difficult to measure results — except in an "after-the-fact" analysis, relating to standard labor hours or material cost.

Productivity managers, however, were quick to grasp the problem, and have divided the entire study of productivity into three major activities:

1. **The impact of capital and technology**
2. **Human potential and motivation**
3. **Measurement criteria**

Value managers focus on single, or a series of individual problems or opportunities, and use the three activities interchangeably to arrive at the best solution. Capital and technology may be the result to effect the value study solution. Human potential, in the form of interdisciplined task teams have always been the primary means of finding the best solution. Quantitative measurement, critical to selling and implementing the solution, and determining the effectiveness of the Value discipline, has been part of the process, but the weakest dimension in the scope of value management. Perhaps it was because we used "savings," a nebulous, nonauthoritative term, instead of "Return on Assets," "Rate of Return," "discounted payback period," "cash flow," "market share," "margins," "profit," "shareholder's equity," etc., etc., that few value managers were able to position themselves organizationally to make a meaningful contribution to the P & L of the parent company.

Some descriptions of the productivity manager's qualifications include: "must have high resistance to frustration"..."a management generalist"..."product line sensitivity"..."effective communicator"..."gets the most out of people"...etc. As to organizational effectiveness: "need top management people"..."no quick fix, requires long term investment"..."must involve all employees"...etc. Sound familiar? It should, those are the very comments heard for 25 years at every SAVE Conference and Local Charter meeting.

So how should we in Value Management look at the emergence of productivity, as an organizationally identified discipline? Let me suggest that we perceive the move as an opportunity, rather than a competitive discipline.

We have often heard that the biggest cause of VE program failure in the U.S. results from "a lack of management support." Regardless of how valid that statement has been, if productivity will not support Value Programs, a critical self appraisal of the program is called for. After all, the Value Discipline offers the Productivity Manager a proven vehicle to achieve his objective. He should therefore, not only support Value Programs, but vigorously sponsor them.

Consider also (and most value managers agree), that VE/VA is a discipline, a technique to improve productivity, rather than an end unto itself. But is productivity an end unto itself? If you agree that the answer is "yes," then the value management function has at last found an organizational home.

The weaknesses that have plagued the growth of value management as an organized discipline are:

- **Lack of meaningful measurement standards**
- **No consistent organizational identity**
- **The implied "quick and huge returns"**
• Little practical knowledge in financial, capital investment, and marketing management

— these may have led to the "no management support" causes. However, the problems in value management are the challenge, objectives, and foundation upon which the emerging productivity disciplines are based.

The amalgamation of the two disciplines is most tempting. The weaknesses of one are the strengths of the other. Together, they can realize their common objectives most effectively.

Will this be another opportunity missed by SAVE? Although it has been expressed in many different ways, the enlightened realization that — Productivity is not a discipline; it is a measure and an objective, should refocus the value manager's approach to the subject.

The principal difference between VE and productivity is VE is a discipline to improve productivity. Productivity improvement is the goal, not the approach.

How then can one rationalize the assigning of producibility to an individual, department or center?

Initially, those charged with the function attempted to establish quantitative goals and measured the effects of motivational programs and capital investments on those performance indices. As time progressed, the productivity manager was pressured to not only measure productivity, but "—do something about it." This would have been the time for Value Engineering to fill the void that existed — the objectives looking for a discipline.

Although there are pockets of successful mergers, for some reason, the two never connected. The result is that today there is almost a consensus of productivity managers who endorse or embrace quality circles as the unofficial productivity discipline.

The fact that the media emphasize the rapid rate of productivity growth in Japan while reporting on their "unique" quality circle approach, does not mean one is dependent on the result of the other. A little deeper probe by the press would show the remarkable contributions made by Japanese Value Engineers in developing products responsive to the market's function/cost sensitivities [value], while exceeding their profit and market growth objectives.

I don't want to imply that quality circles are ineffective — they are not. VE and quality circles are very similar in concept and application. The differences lie in the task team structure [VE — multidisciplinary; quality circles — single discipline] and scope [VE — total product, emphasizing profit; quality circles — segmented, emphasizing cost reduction]. There are other differences which are the subject of a future article, but the point is, I believe the Value discipline is more qualified as the 'adopted' discipline of productivity than others more popular.

I would, therefore, urge value managers to embark on a hard hitting, educational campaign, directed to productivity managers with the objective of matching the solution to the problem.

MARK THESE DATES
April 28 – May 1, 1985
VALUE – ⊕ of the FUTURE
1985 SAVE International Conference

Marriott Hotel
On the Riverwalk
San Antonio, Texas

Value World, Oct./Nov./Dec. 1984 13
"The Role of Value Analysis in a Financially Distressed Company"

By D.E.A. Tannenberg

D.E.A. Tannenberg, B.S.M.E., P.E., joined AM International in 1971 and served as Vice President, Operations for the International Division until 1973, when he was named Managing Director of the corporation's subsidiary in Germany. He served as Vice President and General Manager for Europe, Middle East and Africa, and became President of the corporation's Bruning Division and a Corporate Vice President at the beginning of 1979. In 1982 he became President of Multigraphics and in early 1983 he was also elected Senior Vice President of AM International, Inc.

Presented at The International SAVE Conference, Sacramento CA, May 1984

Those of you who are not familiar with the VA concept may take the view that a company in financial trouble can ill afford to increase expenses by incurring the fees of an outside consulting firm...as well as commit the company's resources and manpower to developing a new program. Conversely, I maintain that a company with financial difficulty cannot afford not to have an ongoing VA program. I will explain how it is working at Multigraphics and tell you of some of the benefits we have already realized, but first, I should provide you with a brief sketch of our company and its current status.

AM International, with corporate offices in Chicago, has total sales of approximately $570 million, about 10,000 employees worldwide in three divisions in the United States, 15 subsidiaries in 15 countries, and 116 dealers and distributors in 112 countries around the world. The corporation started in the office equipment business as the Addressograph Multigraph Corporation. Today, the corporation serves the general field of reprographics through three product divisions, each headquartered in the United States:

- The Varityper Division, one of the leading companies in photo composition and digital phototype-setting.
- The Bruning Division, the leader in the field of engineering reprographics, manufacturing and marketing drafting room equipment and supplies, diazo drawing reproduction equipment and paper, and a highly successful line of low cost computer aided design or CAD/CAM equipment and associated software and supplies.
- The Multigraphics Division, the largest division of AM International, Inc. Multigraphics is a major manufacturer and distributor of offset printing equipment and related consumable supplies and peripheral products. In addition, we provide technical service to our customers in support of the installed equipment base.

The company got its start 85 years ago and became well-known to the printing industry for the development of the 1250 Multilith offset machine. Multigraphics' basic line of offset equipment, including manual duplicators, graphic arts presses, automated duplicators, and sophisticated high speed total copy systems were derived from this basic technology. The company's markets include quick print shops, commercial printers and the in-plant, or the in-house reprographics centers located in many large businesses and in government entities.

In April 1982, Multigraphics' parent company, AM International, filed for protection under Chapter 11 of the U.S. Bankruptcy Code as a result of a liquidity crisis. There were several reasons for these financial problems, but basically they stemmed from the pursuit of a high technology strategy initiated by prior management in the mid to late 1970's. In light of increasing competition from both domestic and foreign competitors, this strategy supposedly was to thrust AM into the office-of-the-future. Instead of resulting in profitable ventures, this strategy created a number of problems:
- It consumed a substantial amount of cash.
- It led to the acquisition of several companies which were all unprofitable.
- It substantially increased the company's total debt.
- It brought about a huge short-term debt that reached a high mark of $170 million in fiscal 1981.
- It resulted in a liquidity crisis that worsened with the deepening recession and the growing uncertainties about AM's future.
- It ignored the basic tenets of the business...including Multigraphics' strengths in manufacturing excellent offset equipment.
- Ultimately, it forced the corporation to file the Chapter 11 petition, after we had incurred losses and write-offs that totalled $245 million in 1981.

Since then, under the protection of Chapter 11, AM International has solved most of its problems. We have divested seven unprofitable divisions, we have down-
sized our operations and we have concentrated on our core businesses, Varityper, Bruning, and Multigraphics. We have introduced new products in all three and are aggressively pursuing our markets. We reported our first profit in nearly three years at the end of our second quarter in February 1983, and the corporation has remained profitable throughout the fiscal year which ended last July 31st. Fiscal year 1983 profits for the corporation were reported at $6.8 million on $558 million in sales compared to a loss of $83 million in 1982. The company has also continued to be profitable on a year-to-date basis in 1984.

In February 1984, the corporation was pleased to announce that we had reached agreement with our Creditors Committee on a revised financial reorganization plan. Reaching this agreement is truly one of the most significant steps for any company in emerging from Chapter 11.

Our operations continue to be profitable in 1984; as a matter of fact, on April 30, we just concluded the sixth profitable quarter in a row. This was mainly accomplished through effective management of assets, where we cut our cost structure down to more closely fit the level of business we were doing.

At Multigraphics, we used our company's Chapter 11 period as an opportunity to examine our product cost structure, and found that there had been no VA or VE utilized for the past decade. As a result, product design was essentially stagnant. No new materials or design alternatives had been considered for most of the production parts or assemblies. Manufacturing costs had continually increased to where it became difficult to maintain a competitive edge, especially with increased competition from foreign sources.

To continue to build quality into our products and, at the same time extract costs, it was obvious that we needed to begin some type of VA/VE program. Rather than wasting valuable time trying to grow such a program in-house and on our own, we decided to seek expert advice to optimize installation of a VA/VE program at Multigraphics.

Value Analysis, Incorporated was chosen for the training because it is a well-established, old line company whose staff members are recognized as experts in their field. Dusty Fowlkes' contribution to the original VA team, led by Mr. Larry Miles at General Electric, is well-known in the world VA community.

The VA effort at Multigraphics began in December 1982 and has been a well-constructed, effective, ongoing program since that time. I established a goal for the VA/VE program to reduce our product costs by 12 million dollars over a three-year period: about 1/3 through VA and 2/3 through VE new products.

Initially, 57 Multigraphics employees were trained in VA techniques in a four-day seminar. Group members were selected from various departments including finance, technical service, manufacturing, engineering, purchasing, and marketing. After studying product function, participants were asked to propose alternative, reliable design ideas, to reduce manufacturing costs.

During this seminar, participants identified 96 cost reduction projects with a total of $1.2 million in potential savings. That's $1.2 million in four days. It occurred to me that we could have reached my goal of $12 million if I had kept the 57 people at the seminar for 40 days; or, as an alternative, had maybe increased participation to 570 people. But that's just an example of what numbers can do to distort the real world.

The task force charged with investigating the 96 identified projects was divided into 12 teams, and the projects were prioritized according to estimated potential savings and ease of implementation. Those projects which could be implemented quickly with no extra cost incurred were given high priority. In cases where extensive tooling costs had to be considered, or where there was substantial inventory on hand, further analysis has been necessary.

The 12 teams that were formed in December of 1982, have continued to work together to examine the practicality and cost effectiveness of the identified possibilities. Many items have been added to the list. We have also increased the number of VA teams by 10 to a total of 22 teams. They are working on items with varying levels of potential savings.

Of that original amount, it has been estimated that we have already realized a savings of about $300,000. Since December 1982, new projects have been identified, increasing the savings potential up to $4 million. And, to date, we have implemented $1,044,500 in annualized savings and have booked approximately $520,000 in real benefits to our P & L.

Before a design idea can be implemented, it must be approved by management. All levels of management at Multigraphics have been involved in VA/VE meetings and we have not allowed the approval process to slow down the momentum to achieve desired results. There is a total commitment at Multigraphics to the VA effort and this includes line, staff and senior management.

At Multigraphics, VA implementation begins in engineering. After an idea is conceived by a VA team, it is given to engineering to determine its feasibility. If it works from an engineering standpoint, meets or improves quality standards and performs the function at a lower cost, it is approved and sent to manufacturing for implementation.

I am a believer in VA in its pure sense, as a philosophy that begins with design, rather than a 'Let's fix it' approach. To increase product value, the design must start from the ground-up. You must go for the lowest cost, best function right from the beginning, not as a cost-reduction afterwards. That is only a side benefit.

In mid-December of 1983, all of the research, development and engineering staff at Multigraphics received VA training. Their approach to the product development task now will be to examine the function of every component in a product, then determine the best way to build it, in terms of materials, design, etc. With this type of thinking, Multigraphics' future products will be Value Engineered from the start and therefore will not need to be redesigned to be cost-effective. However, this does not necessarily mean we might not add refinements later.

One of the side benefits of VA training is that it teaches employees how to approach a project or task in an organized manner. This step-by-step approach to problem solving has a tendency to spill over and influence the total work habits of those who go through the
training.

Beyond our basic necessity to reduce product costs, this has also been an important period to implement our VA program, because we have had more new product introductions than at any other time in Multigraphics' history. While we have engineered features into all product lines to satisfy customer requirements, expand our market share, and beat competition, it is, of course, necessary to manufacture these products as cost-effectively as possible.

In selecting a product line for evaluation, the 1330/1360 series of small offset presses was chosen, because that line represents the highest volume product in our master schedule for the next few years. The 1300 series was introduced in late February 1983 and was really completely developed before our VA program was established. This product introduction has been very successful, and we have enjoyed a very high order intake subsequent to its release.

This product line was also seen as an important focal point for VA, because it has many functions which are performed in a similar manner on different machine models. Design savings realized on the 1300 series machine have a high potential of being carried across the whole product line.

For example, one of the areas identified for study was the vacuum system of the 1330/1360 product line, which had not changed basically since it was incorporated in an original duplicator built over a decade ago. The vacuum system consisted of a separate motor and vacuum pump connected by a chain drive. The proposed substitution consisted of an integrated motor and pump assembly which could be mounted on the base plate as a single unit. This would not only result in a cost reduction of $37.73 per unit on the 1330/1360 line, but would also cut the cost of three other product lines in a similar manner.

In our VA program, studies have been made that identify other potential projects where there is a design commonality, and the potential savings is seen to be a considerable amount. We have set some very definable goals, both short and long term, in our VA program, and one of them is to reduce the costs of the 1300 series line as much as 20% per unit by December of 1984. To date, we have made some considerable accomplishments toward attaining that goal.

Although the 1300's were engineered and manufactured largely without the benefit of the VA approach, we have been able to take advantage of several opportunities in our latest wave of product introductions.

In August of 1983, at Graph Expo '83, a major trade show, Multigraphics unveiled major redesigns of the balance of all basic product lines, which incorporated many of the new features introduced in the 1300 series. Many of the advancements realized in the 1300 series were engineered into the balance of our manufactured product line. In the new designs, commonality of parts was stressed whenever possible. As a result, we see considerable savings by purchasing parts in volume. The VA/VE approach was also used in this major redesign effort. Accordingly, the new machines are more functional, more serviceable, and easier to operate — and they incorporate cost savings as well.

To further reduce manufacturing costs, we will be looking at components fabricated in-house to determine potential cost savings realized by purchasing them from vendors who practice Value Analysis. Eighteen months ago we closed an unprofitable manufacturing plant in Euclid, Ohio and substituted purchased parts. The result was a considerable savings that had a big impact on our bottom line. Effective management of assets figured very prominently in Multigraphics' profitability this past fiscal year, and one of the keys was eliminating the unprofitability of this facility.

As we establish VA/VE procedures in our fabrication area, selected components will be brought back in-house assembly. In purchasing, we expect to realize further savings by extending the VA concept to key vendors.

When Multigraphics committed to the VA/VE program, long range goals were identified that were considered quite feasible. By the end of 1985 or mid-1986, we intend to reduce the cost of our product by 30% compared to product cost levels at January 1983. The potential sources of these cost reductions have been meticulously documented, and regular status reports are made as the various projects progress. All of the projects identified for study so far are broken down both by model and by dollar savings.

We have 160 employees trained in VA/VE techniques, 60 of whom are engineers, the balance coming from marketing, manufacturing, engineering, production, financial planning, accounting, and administration.

We have identified 157 VA projects; 60 are significant and are being pursued by 22 teams. $4 million in annualized VA savings have been identified; over $1 million in annualized savings have been implemented.

I feel that we have demonstrated our commitment to VA/VE as the benefits are real.

The key word is commitment — and that starts with top management. I am totally committed to the program. A successful VA/VE program needs this support. Without it, many programs fail. No company should be without VA/VE.

Why? VA gives you the opportunity to improve on the past. VE gives you a very effective tool to improve your future, before the fact; and finally, the VA/VE discipline spills over into all areas of the company, benefiting administration, planning, marketing, purchasing and technical service.

I am convinced that by doing all these things, Multigraphics, as a manufacturer of offset printing equipment, can compete even better with strong foreign and domestic competition. I know the VA concept is a sound one, and if practiced correctly, can produce true cost savings. By implementing new design ideas, I expect to see, in many cases, improved performance and a better product. Ultimately, Multigraphics will be saving money, and our customers will be getting more value for their dollars as well. There is a wealth of knowledge at Multigraphics, and VA/VE is providing a viable method of drawing on that tremendous resource.

Companies not practicing VA/VE today — especially if they are in financial difficulties — are missing out on a very real opportunity to make long term improvements in their product lines, provide value to their customers, and make major contributions to improve their profitability in both the short and long term.

We are already seeing the multiple benefits of VA, and we are looking forward to meeting our future goals. Looking back on our experience so far, if I had the chance to do anything over, it would be to start VA sooner, and with more effort. VA has to become a way of life at Multigraphics, because our future depends on it.
CALTRANS has much to say about the philosophy — and the dollars and cents — of Value Engineering (VE).

Right up front, I want to say that if VE is going to be successful, it must receive a positive commitment from the front office. You can’t pass it off to a group of junior engineers or staffers and expect it to be productive. People have to know that the boss is interested, and it is necessary to let them know that pretty often.

Beyond the idea of a managerial commitment, VE is a discipline. You don’t just go out and look around for cheaper ways to do things. Instead, you take a systematic, disciplined look at your product or your work-load. VE is a discipline just like surveys, hydraulics, traffic, and so on. It deals with value — and value analysis, an important part of transportation engineering.

In today’s high-tech setting, getting the highest value from transportation investments — all investments, in fact — is a key objective and an issue facing management throughout the nation. A second objective, equally important, is to increase productivity. The prescribed objectives of VE since its earliest beginning have been to lower the cost of products and to increase productivity, while achieving excellence in design. VE is a discipline for our times.

CALTRANS has been value engineering since 1969 — 15 years — and we are proud to say that Caltrans was the first in the world to apply VE to transportation projects. We have led in the field, and our record is a good one. Approximately $80 million in current-worth VE reductions have been made over the years — but $60 million of that occurred before 1976.

So I am proud to say that this administration is renewing its commitment to VE. We have put some of our best people to work to give new strength to the program, and we intend once again to lead the world.

By the way, the Federal Highway Administration, in their annual statement on program direction, has listed VE as one of the five key areas of national emphasis for the 1983-84 fiscal year. In addition, FHWA lists VE in their Federal-Aid Highway Program Manual as a key strategy for reducing costs. It further states “VE should be applied to all projects.”

There is a very strong push in Congress for VE to be performed on all projects costing more than $2 million. The feds are taking this seriously, and we are too, although I would rather have a looser criteria, since I don’t want to be spending money to do this or any other activity where it isn’t needed. As George Bernard Shaw said, “We need to have moderation in all things, including moderation.” I think we need to VE everything — including VE.

To put VE to work in California, we have started by assuring that our people understand what it is and what it does.

We are developing a multi-level training program to produce a professionally briefed and trained staff so that only the most appropriate projects and areas are treated. We provide a one-to two-hour briefing for our top managers, one to two days for middle level management, and a 40-hour workshop — approved by SAVE — for as many senior management and project-level staff as is practical.

At CALTRANS’ training workshops, we take existing projects and do VE studies on them as a training exercise. During one of our recent labs, our training group worked on five pavement rehab jobs worth about $10 million. All were near the project report phase, the phase where CALTRANS decides on the basic design features and route locations of highway projects.

The groups recommended more than $2 million in cost reductions. The reaction by management was positive, and it was universally agreed that these pro-
posals should be considered for implementation. I want to stress that a surprising statistical pattern occurs regularly with our studies. Four out of five studies have some form of cost savings opportunity ranging between 10 and 40%. A nationwide average for all VE studies implemented is 20% cost savings.

Now whether you are a company in tight competition during this highly productive phase or our economic expansion, or a governmental agency strapped for funds, those kinds of savings have to make sense.

As we get to the high-yield phases of our own program, we expect a minimum annual reduction or savings, from VE studies, amounting to $25 to $40 million. As a sidelight, we expect that the cost of producing those savings — the study cost — will be somewhere between a half-million and a million dollars.

We expect to achieve not only dollar savings, but time savings, as many of you know in this inflationary world, can be dollar savings.

How does a typical VE study work?

First of all, to select candidates for VE studies we use several criteria: projects where a lot of money is being spent, projects where there are lots of similar items so that a reduction will gain substantial savings, projects where we have a high potential of actually putting our recommendations to work, sole source projects, and so on.

We select a team, some members of which should have VE training. Most should be familiar with the type of project we are working with. We organize the team, and we go into the investigation phase.

In this phase, we reduce a piece of construction to its most basic functions. We select that 20% of the items that generate 80% of a project’s cost — Pareto’s law is at work everywhere!

A retaining wall is to “hold earth.” The aggregate base is to “support pavement.” Culverts “convey fluids,” and so on.

I’ve already gotten us into the brainstorm phase, haven’t I? What we do is sit down, in the most unconstrained situation possible, and start tossing ideas around. We can generate literally dozens of ways to “hold earth” or “convey fluids.” What this provides us with, is a list that we can now evaluate for ability to deliver the function required.

Now our team prepares a recommendation for implementation. It may not always include cost savings, by the way. We may find safer, longer lasting solutions whose cost-benefit over the long term may be higher, but whose initial cost may be higher, too. At this point, it is good if the management group considering our proposals has had some training and encouragement in VE.

They should lean toward accepting new ways of doing things, and they should understand the process that the team has just gone through. But, and this is important, they should provide an outside, objective viewpoint on what our team has suggested, because solutions exist in real worlds, not theoretical ones.

Essentially, that is VE. I want to talk about some of our success stories, but first, I want to assure you that VE doesn’t work automatically. It will not work at all if discipline, knowledge of processes and management commitment to it are missing. Our VE processes worked very well when management was committed to them. Our savings dropped substantially when management decided that VE was a place to put people who disagreed with them.

Let’s look at some specific examples of our success:

- We have identified $2 million in potential savings on the projects that I mentioned earlier — and we are going ahead with the implementation of those savings.
- On the Potato Slough Bridge just south of here, near Stockton, we have recommended a medium level replacement structure, at an estimated savings of $2 million.
- We have modified guidelines for the use of open-graded asphalt concrete for specific conditions which, in the state of California will save us $8 million over the next five years.
- We have suggested alternatives for a truck-weighing station at Cajon in San Bernadino County, with an estimated savings of $500,000 on a $5 million structure.
- We have provided a recommendation which reduced the cost of a highway safety project in Riverside County, from $3 million, to $2 million, a 33% savings.
- We have provided an effective, economical means of replacing missing pavement markers, and are now having a new trailer fabricated which will ultimately save the state $200,000 a year on that function.
- We have initiated a pilot polyurethane foam backfill program for replacing guard rail, signs and other hardware that provides us with a potential for saving $100,000 a year. That project was developed by a maintenance VE team from San Francisco.
- We have assisted quality circle projects outside of our own discipline, which, we believe will result in an improvement of the quality of work life, and better communications between management and workers. — And we believe we will see some real savings there.
- We have provided recommendations during 1983, which are now being implemented, to make roadside litter pickup more efficient through improved hand tools and procedures. Ultimately, the state will save $2 million annually.

The total of our savings, as I have said, has come to about $80 million so far. We believe that we can save $25 to $40 million a year by skillful application of what we already know about VE, enough to provide us with 120 additional personnel years of work on California’s transportation system. That is what I mean by increasing productivity.

CALTRANS will benefit, California’s taxpayers will benefit, and we will have done our job in protecting the state’s $50 billion investment in its transportation system.
Basic Point Method and Optimum Value Zone

Study of VE Methods

By Gu Sin-yi

Mr. Gu Sinyi graduated in 1968 from the Mathematics Department of Nan-king University whose predecessor is Centre National University, China. He worked at a power plant and taught mathematics for 11 years. In 1979, after a keen competition, he was enrolled as a graduate student at Zhejiang University and became specialized in Management/Industrial Engineering. In 1981 he received a Master Degree from the University. Now he is a Lecturer, whose rank in Chinese universities is higher than an assistant professor, at the Management Engineering Department of the University and is engaged in scientific research on management. He is a member of the Chinese Management and Economics Research Institute, a director of Zhejiang Statistics Society, and a vice-chairman of the Council of Hangchou Standards Association.

We write

\[ \text{Cl}_i = C_i / \Sigma C_j, \quad \text{FI}_i = F_i / \Sigma F_j \]

where \( \text{Cl}_i \) and \( \text{FI}_i \) denote the cost index and the function index, respectively. \( C_i \) is the cost of the ith part, \( F_i \) is the score of estimation for necessary function of the ith part, \( i = 1, 2, \ldots, n \) (\( n \) = number of parts of product). Then the value index of the ith part is \( \text{VI}_i = \text{FI}_i / \text{Cl}_i \). The Value Index Direct Analysis Method holds that the cost of the ith part of product matches its function of \( \text{VI}_i = 1 \); and that the cost of the ith part does not match its function and the part should be improved if \( \text{VI}_i \neq 1 \). Nevertheless, this method often leads to incorrect results in practice. Actually what is the trouble with the method? An analysis has been made in reference [2] and yielded the Basic Point Method:

Selecting the Basic Point \( b \), namely such a sort of part for which it was known that its cost had matched its function, we define

\[ \text{VI}_i \approx \alpha F_i / C_i, \quad i = 1, 2, \ldots, n \]

where \( \alpha = C_b / F_b \), i.e., the ratio of the cost to the function of the Basic Point \( b \). Then, we can determine which parts of the product should be improved and what the order of the part-improving job is.

Reference [2] spends much in writing to obtain above method. In fact, we can demonstrate the method very briefly and clearly:

We have \( \alpha \) as soon as the basic point is settled. It is not hard to realize that \( \alpha \) is the reasonable cost per unit of function. Then \( \alpha F_i \) is the reasonable cost of the ith part and \( \text{VI}_i \) is the ratio of the reasonable cost to the present cost of the ith part. Thus it can be seen that \( \text{VI}_i \approx 1 \) means the present cost of the ith part is reasonable, thereby the ith part is not an improving one; and that \( \text{VI}_i \neq 1 \) implies the present cost of the ith is unreasonable, and the ith part should be improved.

Basic-Point Hyperbola Method and Optimum Value Zone

For the sake of convenience, we define three cartesian coordinate planes first:

- U-plane is the plane which takes \( C_i \) as abscissa \( X \) and \( \text{FI}_i \) as ordinate \( Y \); similarly, J-plane, \( C_i / C_b \) as abscissa \( X \) and \( \text{FI}_i / \text{FI}_b \) as ordinate \( Y \); G-plane, \( C_i \) as \( X \) and \( \text{FI}_i \) as \( Y \).

- Mr. Tanaka [1] considers that it is impossible to find an optimum value zone from the Value Index Direct Analysis Method. Thus he introduces a new variable \( T = r \cdot L \) and then derives

\[ T = \frac{1}{2} |x^2 - y^2| \]

where \( r \) is the quantity that the point \( Q(x, y) \) deviates from straight line \( y = x \) on the U-plane; \( L \) indicates how far the point \( Q \) is from origin. Then, a hyperbolic Optimum value zone \( |T| > B \) is obtained, where \( B \) is a constant by choosing properly.

This method often leads to incorrect results in practice, too. What is it traced to? One of the problems, as reference [2] points out, is that the method intrinsically makes the same mistake as Direct Analysis Method: \( |T| \) does not indicate the degree that it keeps up with the best matching of the cost to the function, however, only indicates the degree that it keeps up with the average level. Modifying the method, reference [2] obtains the Basic-Point Hyperbola Method. This method also yields a hyperbolic "optimum value zone"

\[ |T| > B \]

which has the same form as Tanaka Method, but the former is on the U-plane and the latter on the J-plane.

Another disadvantage of the Tanaka Method, Basic-Point Hyperbolic Method is that the process is complicated and ruined the effect by itself.

In fact, obviously the optimum value zone can be characterized by quantity \( |\Delta C_i| = C_i - \alpha F_i \) which directly determines the order of the part-improving job. Or, it can indicate a strip zone \( |x - \alpha y| > B \) on G-plane. Rewriting \( \Delta C_i \) into

\[ |\Delta C_i| = C_i - \text{VI}_i \]

we can see that \( C_i \) is completely determined as soon as \( \text{VI}_i \) and \( C_i \) are given. And

\[ |T_i| = \frac{1}{2} [C_i / C_b]^2 - [\text{FI}_i / \text{FI}_b]^2 \]

\[ = \frac{1}{2} [C_i / C_b]^2 - 1 - \text{VI}_i^2 \]
also is determined by C and VI in the Basic-Point Hyperbola Method, as well as in Tanaka Method. Comparing (1) and (2), however, we can understand that the order determined by $|\Delta C|$ is not identical with the order determined by $|T|$. Hence, errors happen if we determined the order by the quantity $|T|$. (This is the reason that the Basic-Point Hyperbola Method does not work properly sometimes.) And $|\Delta G|$ is briefer and clearer than $|T|$. \\

**Conclusion**

Rational Basic-Point Method can be explained easily and visually. The "Hyperbola Methods" should be discarded. The simplest optimum value zone is strip zone $|x-\alpha y| > B$ on G-plane. By the way, in reference [1] it is also a mistake that the strip zone is groundlessly asserted to be unable to become an optimum value zone. (For understanding this, please note that we still get a strip zone, transformed the strip zone from the G-plane to the U-plane.)

**References**

The Electrical Engineer on the VE Team

By Herbert Peters

Herbert Peters, P.E., Vice President, Arthur Beard Engineers, Inc., is a graduate of the University of Pittsburgh in E.E., a registered professional engineer in Pennsylvania, and is registered both as an electrical and mechanical engineer in Arizona. He has 25 years of experience in electrical and mechanical engineering, and has served on many VE studies. Peters is also a senior member of the Association of Energy Engineers and a member of SAVE.

Without power, pumps would not pump, fans would not fan, lights would not light, yet in many value engineering studies the electrical engineering aspects related to VE are overlooked, or the electrical engineer is not called until the second or 70% stage.

The initial electrical/construction costs of many of the projects that are value engineered represent 10% to 20% of total project cost, and significant initial and life cycle cost savings can be realized in this cost area. But more importantly, analyses of the electrical systems proposed and their impact on energy consumption are items that should be considered by the electrical engineer member of the VE team.

For example, room and area lighting, recent advances in metal halide and high pressure sodium lamps provide the means to design excellent lighting with savings in energy consumed for equal light levels compared to incandescent or fluorescent. Most, if not all, VE-EE's recognize these light sources and recommend them. However, they overlook automatic shutoff of lights after hours, when space or area is unoccupied and neglect automatic control of light level by "Daylight Compensation." Daylight Compensation controls light to equal natural light entering the work area from windows and/or skylights.

After hours or unoccupied can be a simple application of time clocks or incorporation of a program in an Energy Management and Control System (EMCS), if the control of the plant or project warrants such a system. All VE-EE's are aware of the how to apply these systems, but too few are aware of a system where motion detection turns on lights when the room or area is entered. If no additional motion is detected the lights turn off. Such systems are ideal for equipment rooms, pump galleries, storage rooms, work rooms, libraries, and similar areas. Savings in energy and lamp costs are significant. Simple payback in equipment installed costs range from 0.8 to 2.1 years. The Mid-Atlantic National Bank in Englewood, NJ, adopted such a system. In their case, the payback came in 7.65 months.

In rooms or areas with large amounts of natural light, photo cells in conjunction with dimmer equipment maintain the level of light required. This approach, referred to as DAYLIGHTING or "DAYLIGHT COMPENSATION," provides for substantial savings when life cycle costs analyses are made, both in energy and equally important, savings in maintenance labor.

A VE study for the City of Albuquerque, New Mexico (Figs. la & lb) showed a conservative Present Worth Factor (PWF) of $38,680 in savings. The design for the 14,000 sq. ft. facility had 34-400 W HPS lamps on the design development plans. Using the "Daylight Compensation" technique, these were reduced to 250W HPS lamps. With 250W HPS lamps, 30 plus foot candles are maintained in the facility 24 hours per day; for the 20-year life cycle cost analysis, energy costs were reduced from $8,500 per year to $3,900 per year, at 6 cents per KWH, and lamp changes to two.

When the VE team recommends simply turning off lights, the team overlooks at least two important points: (1) people don't turn off lights, and (2) safety. When selected lights in an area are turned off for after hours or unoccupied time, areas of shadow are created. With "motion detection system," and/or daylight compensation these two points are no longer of consideration.

Other applications of VE to lighting should include:
1. General Reduction
2. Tuning
3. Lumen Maintenance
4. Peak demand reduction

General reduction is obvious...in overlighted areas recommend reducing fixtures and/or lamp wattage to meet real requirements of space.

Tuning refers to reducing light levels, and watts used, on an area by area basis to meet the minimum task/lighting needs, by dimming. This method, in addition to energy savings, increases lamp life with a reduction in maintenance costs. It is particularly adaptable to existing facilities that are being VE'd for expansion.

Lumen maintenance is the technique of controlling...
and maintaining light levels at a fixed foot candle level through the life of the lamps. This technique not only reduces watt energy consumed but reduces first cost by eliminating the 70% maintenance factor applied in lighting design. This technique is referred to as Lighting Energy Adjustment and operates similar to Daylight Compensation in that a photo cell constantly monitors and adjusts the watt input to maintain a preset foot candle level.

Peak demand reduction is useful where lighting is not or can not be turned off but may be dimmed. For example, secure areas that are video camera controlled—building lobbies and corridors, public areas in banks, and security points in airports.

Another example of VE overlooked by some electrical engineer members of the VE team is the use of Variable Frequency Drives (VFD) for both pumps and fans. Many mechanical engineers are beginning to look at VFD's for better control of pumps and fan applications without any real knowledge of the implication of misapplied VFD equipment.

The electrical engineer is perhaps better equipped to make the design recommendations and to evaluate the peripheral problems imposed by VFD’s on other components in the overall project. For example, using [Silicon Controlled Rectifiers (SCR’s)] and computers on same bus, the design electrical engineer is better able to size the electrical equipment and evaluate the electrical load (ampere) impact on motor control centers, main bus sizing and ultimately on the main service equipment.

When properly selected and applied, VFD’s soften the start/load electrical demand on the electrical system; they reduce KW load by providing only that amount of power actually needed to meet pump demand or fan demand; and when life cycle cost analysis is properly completed, further savings in pump or fan life and pumps or fan bearing maintenance are realized.

The cry, “they are too expensive” should not deter the VE team from a thorough analysis of the life cycle costs of the approach to pump and fan control. For example, standard off-the-shelf motors are used — no special motors are required...only the AC motor is controlled...no mechanical variable speed connection is required...switchgear costs are reduced — since the AC VFD can be used for primary starting equipment. Additional savings can be made in wire and conduit since VFD’s limit current in rush to 110% of the full load amperage of the AC induction motor.

Examples in a recent VE Study [Figs. 2a thru 2d] show how VE can use this innovative concept. The design concept was to replace six existing pumps in a pump station and add three new pumps in a new pump station addition, mixing variable and constant speed in both places. The designers were unable to show how constant speed pump curves and variable speed pump curves would affect each other. The recommended solution: to provide VFD’s for the six pumps in the existing pump station and constant speed pumps for the three in the new pump station addition, using it for storm overflow only. This recommendation solved the problem of variable pump heads and provided annual savings with an estimated present worth of $93,700.

In Fig. 3, the use of VFD reduced capital cost and provided for energy saving. The original concept provided for six two-speed pumps to satisfy flow demands. The recommendation was to use three
pumps instead of five, providing full standby, and use VFD's to satisfy the varying flow condition. The conservative estimated savings was $207,000.

In the application of VFD's, many engineers are using 1 VFD per pump or fan without realizing that several pumps, operating in parallel, may be controlled by one VFD. If failure of the VFD is a consideration, several manufacturers provide by-pass as standard. With this feature, the VFD may be repaired while the pumps are running. A major advantage to the concept of one VFD for two or more motors, in addition to first cost, is equal drive to all pumps from the sensing and controlling elements.

For applications where supply and return fans on variable volume systems are controlled by one static sensor, the single VFD for both fans is both good design and cost saving. Several manufacturers provide by-pass as standard. Several pumps, operating in parallel, may be controlled by VFD's to satisfy the varying flow condition. The concept of using several VFD's to control pumps instead of five, providing full standby, and use VFD's to satisfy the varying flow condition. The conservative estimated savings was $207,000.

In the application of VFD's, many engineers are using 1 VFD per pump or fan without realizing that several pumps, operating in parallel, may be controlled by one VFD. If failure of the VFD is a consideration, several manufacturers provide by-pass as standard. With this feature, the VFD may be repaired while the pumps are running. A major advantage to the concept of one VFD for two or more motors, in addition to first cost, is equal drive to all pumps from the sensing and controlling elements.

For applications where supply and return fans on variable volume systems are controlled by one static sensor, the single VFD for both fans is both good design and cost saving. Several manufacturers provide by-pass as standard.
200,000 AIC, breaker that lists at $3223 compared to an equal fusible switch with LPS-RK fuses at $1934.

Above 400A switch gear equipment (from 800 to 1600A, main breaker or switch with equal AIC rating), cost differences become very much a VE cost item. Perhaps it is too easy to use the higher cost breakers and transformers, since short circuit analysis and fuseology are fields electrical designers seem unable to afford the time or seem unwilling to take courses available to refresh themselves in these fields.

This does not excuse the VE team. Our function is to bring these cost and safety features to the client — to whom, after all, we are committed.

---

**PROJECT**  
Indian Creek MBMS Dist. 1  
**LOCATION**  
Mission, Kansas  
**CLIENT**  
Johnson County Unif. WW Dist  
**DATE**  
April 2-6, 1984  
**PAGE**  
1 OF 5

**ORIGINAL CONCEPT:** (Attach sketch where applicable)

Existing Plant:  
3 8 MGD constant speed  
2 exist. 125 HP  
3 8 MGD variable speed

New Plant:  
2 12 MGD variable speed  
1 12 MGD constant speed

Control by elevation of the wastewater and wet well  
Require 22.5 MGD dry weather flow maximum day

**PROPOSED CHANGE:** (Attach sketch where applicable)

Refer to Sheet 3 and 4  
Existing Plant all VFD  
New Plant all constant speed

**JUSTIFICATION**

Sheet 3 - Existing plant would operate on changing level and pump alteration, put equal volume and head on pumps, thus equal wear extending life, reduce maintenance.

New Plant - storm flow operates with pumps stepping in on rise in new plant wet well. On line time is short relative to existing plant. In existing 18 month old plant mag. couplings have already had problems.

---

**LIFE CYCLE COST SUMMARY**

<table>
<thead>
<tr>
<th></th>
<th>CAPITAL</th>
<th>O &amp; M COSTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL COST—ORIGINAL</td>
<td>254,800</td>
<td>26,609</td>
<td>281,409</td>
</tr>
<tr>
<td>PROPOSED</td>
<td>453,400</td>
<td>46,609</td>
<td>499,999</td>
</tr>
<tr>
<td>SAVINGS</td>
<td>(198,600)</td>
<td>(20,416)</td>
<td>(168,100)</td>
</tr>
<tr>
<td>ANNUAL COST—ORIGINAL</td>
<td>118,640</td>
<td>118,640</td>
<td>237,280</td>
</tr>
<tr>
<td>PROPOSED</td>
<td>88,590</td>
<td>88,590</td>
<td>177,180</td>
</tr>
<tr>
<td>SAVINGS</td>
<td>(20,416)</td>
<td>(20,416)</td>
<td>(40,832)</td>
</tr>
</tbody>
</table>

PRESENT WORTH OF ANNUAL SAVINGS  
93,714

Figure 2a
A 2VS ICS Pump to Plant (LP4, LP5, LP6) 24 mgd
B 2CS IVS Pump Storm (LP1, LP2, LP3) 24 mgd
C 1CS 2VS Pump Storm (LP7, LP8, LP9) 36 mgd

A: Is daily - the ICS pump operates on-off, the 2 VS pumps move with influent level.
B: Storm water 2CS and IVS start on wet well level rise.
C: Storm water ICS and 2VS start on wet well level rise.

Figure 2b

A. Proposed: 1CS pump operates to 8 MGD on-off (5,500 gpm) with level control. 2VS pump operate above 8 mgd to 22.5 mgd. The CS pump has a finite life (4-6 yrs.).

Recommended: 3 pumps with VS (VFD) use logic B.O. To alternate at low level - IVS pump on (any one) 2nd & 3rd on with level rise.

Life of pumps is increased to +20 years. Maintenance is reduced, operator error is reduced, Energy is saved (not big savings - but savings) flows to primary clarifiers is leveled.

B. Proposed: 2CS pumps operate above 22.5 mgd 1VS pump operates - operator decision with wet well level control.

Recommended: 3VS pumps following reasons in A. Plus as one is used in place of KP4, 5, or 6 the standby for feed to plant operational sequence is not changed.

C. Proposed: 2VS ICS pump operate above influent flow of 46.5 mgd to 60 mgd operator decision which operates.

Recommended: All CS pumps - these are storm flow level controlled.

Figure 2c
<table>
<thead>
<tr>
<th>ITEM : VFD's on Pumps B-6</th>
<th>ORIGINAL</th>
<th>ALT. 1</th>
<th>ALT. 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. CONSTRUCTION COSTS</td>
<td>254,800</td>
<td>453,400</td>
<td></td>
</tr>
<tr>
<td>2. REDESIGN COSTS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. TOTAL INITIAL COST</td>
<td>254,800</td>
<td>453,400</td>
<td></td>
</tr>
</tbody>
</table>

**LIFE CYCLE EXPENDITURES**

<table>
<thead>
<tr>
<th>Year</th>
<th>a 100%</th>
<th>Amount</th>
<th>Present Worth of Future Replacement Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>10</td>
<td>100%</td>
<td>140,000</td>
</tr>
<tr>
<td>5.</td>
<td>20</td>
<td>100%</td>
<td>140,000</td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td>189,448</td>
</tr>
</tbody>
</table>

**SALVAGE VALUE** (Pwf' = 0)

<table>
<thead>
<tr>
<th>Year</th>
<th>a</th>
<th>Amount</th>
<th>Present Worth of Salvage Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ANNUAL OWNING OPERATING COSTS**

- **Amortized Initial Cost** (Crf = )
- **Replacement Cost** (Crf = 1078)
- **Maintenance**
- **Operations Equal**
- **Powers Energy**

**TOTAL COST OF OWNERSHIP**

**ANNUAL COSTS (ACTUAL)**

- **Maintenance**
- **Operations Equal**
- **Powers Energy**

**TOTAL ANNUAL OWNING & OPERATING**

**Net Annual Owning & Operating Cost**

- **PW of LINE 14 (CWF (UNIF. PWF) = 9.73749)**
- **SAVINGS**

**Savings**

---

Figure 2d

Value World, Oct./Nov./Dec. 1984
DEVELOPMENT AND RECOMMENDATION PHASE

ITEM: RAS P.S., Use VFD's Reduce Number of Pumps

NO: M-4

ORIGINAL CONCEPT: (Attach sketch where applicable)

2 - 1.5 MGD 2 Speed
2 - 3.0 MGD 2 Speed
1 - 3.0 MGD 2 Speed

PROPOSED CHANGE: (Attach sketch where applicable)

1 - 3.0 MGD Variable Speed
2 - 6.0 MGD Variable Speed

JUSTIFICATION

Reduce first cost, operation cost, provide greater flexibility. If controls are added, variable speed (VFD) will reduce energy costs consuming only the KWH's required to maintain flow of sludge.

<table>
<thead>
<tr>
<th>LIFE CYCLE COST SUMMARY</th>
<th>CAPITAL</th>
<th>O &amp; M COSTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL COST - ORIGINAL</td>
<td>240,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- PROPOSED</td>
<td>235,600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SAVINGS</td>
<td>4,400</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANNUAL COST - ORIGINAL</td>
<td>24,672</td>
<td>134,600</td>
<td>159,272</td>
</tr>
<tr>
<td>- PROPOSED</td>
<td>24,219</td>
<td>113,780</td>
<td>137,999</td>
</tr>
<tr>
<td>- SAVINGS</td>
<td>453</td>
<td>20,820</td>
<td>21,273</td>
</tr>
<tr>
<td>PRESENT WORTH OF ANNUAL SAVINGS</td>
<td></td>
<td></td>
<td>206,932</td>
</tr>
</tbody>
</table>

Figure 3
DEVELOPMENT AND RECOMMENDATION PHASE

ITEM: Sludge Thickener Change MSB From Breaker to SW/Fuse
NO: D-4

ORIGINAL CONCEPT: (Attach sketch where applicable)

Power breaker board with GF on all breakers.
1600A mains and tie breaker.
Distribution Breakers - drawout
600 Amp 600V
2 Feeders

PROPOSED CHANGE: (Attach sketch where applicable)

1600 AMP
Bolt-loc. fusible mains and tie SW GF on mains. Distribution SW and Fuse 600A, 600V with LPS-RK Fuses (QMB or equal).
2 Feeders

JUSTIFICATION

Shirt circuit protection, no change in operation, reduction in capital cost.

LIFE CYCLE COST SUMMARY

<table>
<thead>
<tr>
<th></th>
<th>CAPITAL</th>
<th>O &amp; M COSTS</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>INITIAL COST - ORIGINAL</td>
<td>205,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- PROPOSED</td>
<td>105,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SAVINGS</td>
<td>100,000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ANNUAL COST - ORIGINAL</td>
<td>21,074</td>
<td>-0-</td>
<td>21,074</td>
</tr>
<tr>
<td>- PROPOSED</td>
<td>10,794</td>
<td>-0-</td>
<td>10,794</td>
</tr>
<tr>
<td>- SAVINGS</td>
<td>10,280</td>
<td>-0-</td>
<td>10,280</td>
</tr>
<tr>
<td>PRESENT WORTH OF ANNUAL SAVINGS</td>
<td></td>
<td></td>
<td>100,000</td>
</tr>
</tbody>
</table>

Figure 4
REVISED EDITION AVAILABLE
November, 1984

Directory of Value Analysis/Value Engineering Consultants

SAVE
Society of American Value Engineers
220 North Story Road, Suite 114
Irving, Texas 75061
(214) 986-6171

FREE from

The Society of American Value Engineers

Consultants who wish to be included in the Directory should call Rita Bates, 214/986-5171.
Space available for ¼, ½, and full page advertisements.
Some time ago while on a business trip, not in Toledo, I relaxed by reading the evening newspaper. Perusing the want ads, I discovered nearly a dozen inquiries for exotic dancers and foxy chics; none for Value Engineers. This tells me something.

About the same time, an article appeared in a local newspaper announcing that State Administrators had eliminated a long established employee cost reduction program as an economy move.

Specifics mentioned were that the program being sacked had saved the state two million dollars the previous year; program administration costs returned approximately a six-to-one payback.

An economy move?
The rationale for the decision was the feeling that cost improvement, without the aid of a formal program, would continue to occur as a normal way of life. This tells me something.

In a conversation with a corporate president of a Fortune 500 Company, he mused: "Value Analysis is nothing but good old fashioned cost reduction."

Again, the dialogue told me something.

Prefacing my remarks with these anecdotes, I would like to convey these — my personal candid thoughts on where Value Engineering is today. It is not where it could or should be after three decades of practice in American industry. We need to capture more of the opportunity that is available.

Value Engineering has great charisma. Anyone who has been involved in a VE learning experience usually becomes a believer. Its functional approach is almost magical. It has a certain mystique and power; it is unique.

Many companies have been exposed to the VE discipline with excellent initial results. Yet, not all continue to use it in upstream plans.

Let me tell you why I think this is so.

The principles of VE are not sufficiently understood, nor are the tangible effects that VE can provide on the financial statement fully recognized, appreciated or believed.

The biggest obstacle, however, lies not in academic aspects; rather, it is that many have had difficulty effectively integrating the VA/VE function into the existing table of organizations — and modus operandi.

Probably the most pivotal question in an organization following the initial VE exercise is — Where do we go from here? The answer lies in the philosophy of the individual business centering on the issue: Is Value Engineering a discipline to be used as a tool by all functions; or is it a separate function on the table of organizations, or both? My experience has been that those companies treating it as both, consciously or unconsciously, have been more successful in its use.

Contributing to the integrational difficulties are attitude or structure problems which I define as syndromes, and are:

- Forty Hour Workshop Syndrome
- Cost Improvement by Decree Syndrome
- Blame - Cost Defect Syndrome

I will describe and comment on these syndromes in later articles.

Summarizing my overview thoughts on where VE is today, I would say this:

As a broad concept, it has grown remarkably well. Starting in General Electric Company in 1947, it has spread throughout industry, government agencies, the public sector, medical fields, construction, and more recently, has seen application in non-hardware related areas.

Yet, with all this, VE has not enjoyed the staying power due the discipline. Much of this difficulty lies with the syndromes and issues to be discussed later.

VE can move on to much higher levels of achievement if these restraining forces are addressed in the mid 80's.

Wouldn't it be nice to pick up the want ads in Toledo and see an ad for a Value Engineer? Especially one that could dance.
CALL FOR PAPERS

1985 SAVE INTERNATIONAL CONFERENCE

VALUE — ⭐ OF THE FUTURE

SAN ANTONIO, TEXAS
MARRIOTT HOTEL ON THE RIVERWALK
APRIL 28 – MAY 1

FEATURING...

TECHNICAL PAPERS AND PANEL PRESENTATIONS EMphaSIZING
CREATIVITY — QUALITY CIRCLES — "GLOBAL VALUE"

To present a paper to the SAVE International Conference you must have a paper published in the Proceedings.

The first step is to select your subject. Please check with the Conference Chairman or the Proceedings Editor to see if your subject is compatible with the Conference theme.

Once the subject has been approved, the Editor will send you a brochure on how to prepare a paper for the SAVE Proceedings. Please follow the directions carefully for if you do not, your paper will be unacceptable and we will lose your services as a speaker.

The brochure will direct you to prepare a draft of your paper, complete with abstract and biography. These should be sent to the Editor as soon as possible, but not later than November 1, 1984. The edited paper will be returned to you for typing on the special SAVE paper, which will accompany the edited copy.

The final typed copy MUST be received by January 1, 1985 or it can not be given to the printer by his deadline for having the Proceedings ready for the Conference.

Please contact:

Ginger Willingham or Jim Vogl, Editor
Conference Chairman
VEI, Inc.
4909 via el Sereno
10712 N. Stemmons
Dallas, Texas 75220
7209 via el Sereno
Dallas, Texas 75220
(214) 357-0870
(213) 378-1803
SEND COMPLETED ORDER FORM TO:

SOCIETY OF AMERICAN VALUE ENGINEERS, INC.
220 North Story Road, Suite 114, Irving, TX 75061
(214) 986-5171

Please send to my attention the following items:

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Description</th>
<th>Unit Cost</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

All prices subject to change without notice.
All prices include Book Rate postage and handling.
Interest will be charged at the rate of 1% per month on all accounts not paid within 30 days.
Add $11.00 per book for Overseas Airmail.

FULL PAYMENT IN U.S. FUNDS MUST ACCOMPANY ALL ORDERS

To qualify for Member rates, show Chapter Name: ____________________________

☐ Visa ☐ MasterCard  Card number ________________________________ Expires __________

Signature required for Visa and MasterCard.

Enclosed please find Check _______  Purchase Order _________ in the amount of $_________

Name ____________________________

Title/Position ____________________________

Company ____________________________

Address ____________________________

City ____________________________ State ______ Zip ______

Office Telephone ____________________________

Society of American Value Engineers
220 N. Story Rd.
Suite 114
Irving, TX 75061

ADDRESS CORRECTION REQUESTED

002144 DFC 03052-0466
FOWLER, CVS, THEODORE C
THE FREELANCE GROUP, INC
2308 CHAPEL DRIVE
FAIRBURN, OH 45324

Bulk Rate
U.S. Postage Paid
Chicago, Illinois
Permit No. 4269