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COVER:

"Let Every Nation Know ..............."

America's hope for the future is characterized in the cover photo's unique trinary blending of the calm scenery-symbolizing peace, the Washington Monument-symbolizing our Heritage, and the carved words of commitment.
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SAVE BOARD OF DIRECTORS

SEATED: John Groothuis, Bernie Kerrigan, Jimmie Carter, Alice Mozley, Dick Park, Tom King

BACK COVER

Happy people from Joy Manufacturing's PEP, Cost Improvement Awards Dinner. Joy was highlighted in cover story, June issue of MACHINE AND TOOL BLUE BOOK as having a AAA-1 cost improvement program. With this magnitude of involvement its easy to understand why.
Not so long ago, a newspaper item reported that Senator Edward Kennedy had been named "Father of the Year" by the National Fathers' Day Committee. Perhaps, deservedly. A coincidence lies in the fact that John Kennedy preceded him in this honor. And Robert Kennedy preceded John who preceded Edward or it may have been that John preceded Robert who preceded Edward in being named Father of the Year. I'm not sure. But.....I'm certain of one thing: Frank Paul Heckler never received this honor, and never will, but I do not know why.

Frank spent 50 years in the coal mine, beginning as a waterboy at age 12. A half century in that dark, damp, dangerous place. He lost a leg, a father and a brother to the perils of the mine; all in the course of providing for his family. Unpoetically, the other leg was broken also, along with many less serious scrapes.

Frank got up in the mornings and went to work; he worked, came home and in a while, went to bed. And he got up the next day and continued this process without bellyaching or regret. On Saturday mornings he mowed the lawn and in the afternoons he sometimes slept in a hammock. Sundays he went to Church. He embarrassed neither his family nor his friends; nor himself. Frank has values.

My point is this: There are many heroes in this world, many good Fathers, and they are not all leaping through airports hustling rental cars. Some Fathers do their thing in a perhaps uncharismatic, yet very important way; such as diligently working in the mines for 50 years. Nevertheless, they are the backbone of our nation. They are not one Monday's hero --- they are an everyday hero. A shining, sparkling example. One to look up to. They set the pace with moral and religious value, which maintains order within a democracy and fully impacts economic values. And we had better begin to realize it.

The productivity crisis is no fluke. It is being caused more by the spirit than the lack of a good pick and shovel. Next year, I believe I will nominate Frank Heckler for Father of the Year. And the following year Bill Heckler. And the following..........
What better method to indicate S.A.V.E. Chapter functions than through a FAST diagram? This method for reviewing effective operations can be used by any professional group.
HANG UP THIS PROFIT CENTER: A SUGGESTION BOX —
Not a bad idea! Suggestion Systems were lauded in a June issue of Iron Age as a means of improving profitability in business.

Mr. Raymond Roberts, pressed metal worker at GM - Chevrolet, Indianapolis Plant, is credited as the all-time high achiever in GM’s suggestion program. A whopping 100 thousand dollars plus some!

When asked for the secret of his success, Mr. Roberts replied:

"Because I worked hard at it".

Several companies were highlighted in the article including Chrysler, Kodak and Timken Company — who is now in its 53rd year of its suggestion program.

Said Justine Clark - President of NASS:

"Idea power is the greatest natural resource in this country. No one has a monopoly on brains. A formalized suggestion system will gather savings far in excess of the money spent on the operation of the system itself."

DOING IT RIGHT —
I am very pleased to report that we at the John Deere Harvester Works in East Moline, Illinois, for the past several years have had a complete Value Engineering Program. When the Product Engineering Department writes a new work order, they always include time for value engineering meetings (if the order contains more than 10 drawings). In other words, "we are doing it right the first time".

"Doing it right the first time" means that we form our V.E. teams on new products one to four years before they go into production, and therefore make our suggestions for greater value at a point in time when the part does not have to be retested or retooled. Furthermore, these suggestions live the entire life of the machine, whereas by the time V.A. suggestions finally get implemented, often one-half of the production life is already past.

ARNOLD B. SKROMME, CVS
JOHN DEERE HARVESTER WORKS
EAST MOLINE, IL

COSTS —
Your costs can be reduced, significantly, usually more than 10% by a well-prepared Value Management Program. Unnecessary costs creep into every design, every operation, every department of every company. It is the continuing responsibility of top management to find these excessive costs, eliminate them as rapidly as possible, and maintain a high level of morale throughout the organization.

JAMES W. HUDSON, CVS
ARLINGTON, VA

PRODUCTIVITY —
Management must increase its ability to measure social change and the performance of the service sector if future productivity needs are to be met, according to James L. Hayes, president and chief executive officer of the 55,000 member American Management Associations.

In a keynote address to a productivity conference sponsored by Work Factor Associates of the East, Mr. Hayes warned executives that "the speed at which society is moving is creating pressures that business has not yet recognized, but it is already apparent that we need to rethink the fundamentals of management in terms of what they ought to be under these conditions."

While there has been excellent progress in improving the productivity of people with machines, there is still much to be done in developing better performance in service operations which now employ two-thirds of all workers, Mr. Hayes declared.

And if productivity gains in all areas are to be maintained, he noted, techniques for measuring performance must be accompanied by an increase in human satisfaction on the job. "We cannot control people, but merely provide the instruments that help them control themselves," he said

JACK BERNSTEIN ASSOCIATES, INC.
NEW YORK, NY

TOASTMASTERS —
Professionals of Value Engineering have long recognized that "selling the project" is where failure of the project often occurs. Many value engineers who possess the ability to perform an excellent value study, have had little success in making oral presentations. They have not had the opportunity to learn how to make a good oral presentation. Toastmasters has given many of Amana’s Value Engineers the opportunity to learn how to improve their techniques in making effective oral presentations.

Due to the organized speaking program that Toastmasters International offers, Value Engineers who have joined Toastmasters have shown a marked improvement in their Value Engineering presentations. Quite often, this improvement may be noticed after delivering only two or three practice Toastmaster speeches.

A Toastmasters speech program stresses preparing, organizing and constructing speeches or presentations. Members concentrate on developing a step-by-step speaking process, using words correctly, using their voices effectively, and using gestures. The skills of listening, knowing an audience, and overall professionalism are also practiced by Toastmaster members.

DERRELL KAY
AMANA REFRIGERATOR
Your 1978 SAVE International Conference Committee is issuing a call for papers using the "HOW TO" concept illustrated above in order to allow you to share your successful programs with all who attend.

SUBMIT TO:
Mr. Robert L. Campbell
P. O. Box 24590
Speedway, Indiana 46224

SUBMITTAL REQUIREMENTS:
100 word biography
Black and white photograph
150 word abstract of paper

SCHEDULE:
October 1, 1977 — Abstract Due
November 1, 1977 — Notification
February 1978 — Submit Paper

JUDGING OF SUBMITTALS:
All papers will be thoroughly reviewed by a National Committee using the relationship of "paper to theme" as a basic criteria.

Note: A special speakers' reception will be held to honor all whose papers are accepted.
Mrs. Clark is President of the National Association of Suggestion Systems (NASS) and serves as director of the greater New York Chapter. She received an Associate Liberal Arts Degree from Green Mountain College and has previously held responsible positions with General Electric and the Illinois Bell Telephone.

A Bright Idea

How do we get America moving again? Leaders in the private and public sectors of this country, feel that one answer lies in increased productivity. In factories, offices and city hall the search is on for ways to raise labor’s output.

The U.S. Department of Labor statistics tell us that the nation’s private output per hour worked has declined from 3.8 percent in 1966 to an estimated 1.1 percent in 1976. Should the decline continue it will be difficult to raise workers’ income and living standards and to keep U.S. products competitive in world markets.

The old American spirit of industry and frugality is being examined again for now the health of the U.S. economy is at stake. It was that spirit, from the days of indifference, which built this country into the most productive nation the world has ever known.

In recent years, government and American business have trimmed budgets for research and product improvement; some economists believe that this has been a big factor in the slowdown of productivity growth. The “bright idea” has become an endangered species for far too few organizations are concerned about their preservation.

Suggestion Systems are not a universal phenomenon. Many companies choose not to embrace with or sustain a suggestion program, often because they are not convinced it is economically sound. The National Association of Suggestion Systems 1976 Statistical report informs us that the net savings to cost ratio is $6.56 to $1, or for every dollar spent there’s a $6.55 return on investment. That’s better interest than most banks pay.

If this nation is truly concerned about increasing the productivity of the American worker, then Suggestion Systems, which are a formal (structured) vehicle for receiving, implementing and rewarding workers for their bright ideas, should be to American industry and government what baseball, hot dogs and apple pie are to every American!
To Our Readers: This series is being written to assist you in becoming more professional. Each issue will highlight a technique for you to try in your daily activities. It has been said that “If you are not moving ahead, you are falling back; for there is no such thing as standing still.”

Many techniques have been developed to assist the professional in accomplishing his specific task. The use of a technique depends on the particular individual – his work, and how imaginative he is in adapting the technique to his needs.

Guest Author
Arthur E. Mudge
Vice President, Value Planning
Joy Manufacturing Co.

Numerical Evaluation

This technique was developed as a tool to readily and simply establish the order of importance of any list of functions or random list of events. For precise balance is that which makes a product or service both work and sell. This precise balance must be determined and/or maintained to keep the item useful to all.

To achieve or understand this balance of the required and/or desired functions or events, the Specialist must have a complete understanding of their relationships. This technique, by means of simple comparisons and weighting, establishes this understanding.

NOTE:

Full details of this technique can be secured from the following:
Numerical Evaluation -- Instructions

Considerations In Buying A Car

<table>
<thead>
<tr>
<th>Key Letter</th>
<th>Functions</th>
<th>Weight</th>
<th>Ranking</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Comfort</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>B</td>
<td>Safety</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>C</td>
<td>Cost</td>
<td>14</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>Operating Economy</td>
<td>23</td>
<td>1</td>
</tr>
<tr>
<td>E</td>
<td>Maintainability</td>
<td>19</td>
<td>2</td>
</tr>
<tr>
<td>F</td>
<td>Horsepower</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>G</td>
<td>Pollution Emissions</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td>H</td>
<td>New</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>I</td>
<td>Appearance</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td>J</td>
<td>Used</td>
<td>3</td>
<td>9</td>
</tr>
</tbody>
</table>

1. List functions, elements to be compared. In this case-comfort, safety, cost, etc.

2. Based on information obtained, compare “A” with “B” (comfort VS Safety), and place the letter representing the most important in the upper left hand block in the matrix. Add to this block the appropriate weight factor, i.e., 1-2-3. the weight factor is determined by the speed of the decision, i.e., if rapid use 3, etc.

3. Compare “A” to “C” (Comfort VS Cost) in a similar manner and add the weight factor.

4. Compare “A” to each lettered element below it, determining importance and weight.

5. When this is done, step down to “B” and compare it, on a one to one basis, to each lettered element below it. Continue this process until every element has been compared to every other element.

6. After all elements have been compared, add the weight factors for each letter, both vertical and horizontal, and place the total in element.

7. Then establish the descending order ranking, the element with the highest weight being #1.

S.A.V.E.
The Consequences of Criticism

by

Myrt W. Webb, APD

Fred Manager looked up from his desk and issued a snort of irritation. Through his office door he could see two of his trustworthy staff members, comely Judy Saxphot and young Chuck Lathario, leaning over the water cooler.

"Valuable productive time is being lost to accommodate their confidential boy-girl patter," Fred said to himself. "I'll put a stop to it." Fred resolved as he scribbled the last phrase on a memorandum, breaking his pencil point for emphasis.

As Mr. Manager rounded his desk and advanced toward the dawdling couple he gave little consideration to the complex situation he was about to trigger. Obviously, Miss Saxphot and Mr. Lathario found their conversation mutually rewarding, or positively reinforced. Manager's anticipated behavior represented a factor that would be punishing to the couple in all probability. He was about to employ the most powerful instrument available for altering a specific behavior; the negative reinforcement!

Fred, with hands on hips, and in a well modulated voice, addressed the couple with, "Don't we have better things to do than this?" reinforcing the statement with both arms suddenly extended toward the water cooler. After an admonishing glance, and without waiting for an answer to his question, Fred turned on his heels and reentered his office.

Manager, after a moment, looked up from his desk to observe that the water cooler area was unoccupied. A smile of triumph crossed his face; a testimonial to what he had always been taught – criticism is the best way to shape people up! It may be if – Mr. Manager's sole objective was to move the couple from the water cooler! That was accomplished. But what else was accomplished? Aye, there's the rub.

Fred Manager assumed that his behavior in issuing the criticism was the controlling factor in the situation. Not so! The consequential behavior of Saxphot and Lathario controlled the situation then and their behavior will continue to control their relationship with Fred from now on. Mr. Manager can do little about it. He may well have become the victim of his own behavior. He has no option except to be the recipient of whatever consequences may accrue to him as administered by each of the couple operating individually or in concert. They will dictate the results of this situation, not Fred Manager. He can only hope they will "do the right thing."
A famous football coach once said, “When a pass is thrown in football, three things can happen and two of them are bad.” So it is with criticism, or negative reinforcement; even more so.

The desirable thing, from Fred Manager’s viewpoint, is that Judy and Chuck will see the merits in his action and feel appreciative that their errant behavior has been pointed out. They, hereafter, resolve not to repeat the specific behavior or to participate in any behavior that may meet with Mr. Manager’s disapproval. You scoff, dear Reader, but it could happen. The probability is about equal to the completion of a seventy yard field goal. But, doesn’t the criticizer usually expect such behavior to result on the part of the criticized?

An undesirable result, from Mr. Manager’s viewpoint, is that Mr. Lathario and Miss Saxphat will react negatively to the criticism and allow it to affect their office behavior adversely for some time to come. The probability of this happening is about equal to a fifteen yard completed pass being ruled first down.

Another undesirable result, from Fred’s viewpoint, is for Judy and Chuck to be unable to assess his behavior toward them as negative or positive. This could happen! In this case Lathario and Saxphat are apt to feel negatively and their resulting behavior will be the same as if they had assessed it negatively! The possibility of their feeling positive in non-assessment of the event is about equal to a trapped pass being ruled completed.

The resulting behavior may not be the same for Chuck and Judy. Each of them have different reward-punishment systems. Their reactions to the same stimulus may be divergent, but within a predictable range. Chuck, with a wife and four children to support will weigh negative reinforcement in a different light than Judy, swinging single and free spirit. From each, however, the results will be similar - reduced job productivity and demotivation.

What are the consequences that might accrue to Fred Manager as the result of his criticism? Let’s take a look.

1. The errant behavior may continue in the absence of the criticizer. Chuck and Judy receive positive strokes from their water cooler tete-a-tete. If Fred is to prevent this, he must guard the water cooler. If he does not, the episodes may continue where the positive strokes are given and received, when Manager is not on guard.

2. A substitute behavior may appear in place of the negatively reinforced behavior. Unfortunately, the substitute behavior that follows may be more detrimental to production than if the water cooler episodes are allowed to continue. The positive strokes may be continued in extended lunch hours, in lengthy work breaks, or in verbal trysts at work places other than the water cooler.

A classic example of this substitution happened some years ago in my organizational career. I had an attractive secretary whose productivity was acceptable. One thing -her hair was usually a mess! Her hair drew little attention from me or the remainder of the staff. My organizational superior, however, was another matter. He made such an issue of it that I was pressured to tell my secretary to fix her hair. She did. The very next day she arrived for work nicely coiffured. One problem - she was half-hour late. I explained to her that she was expected to arrive at work on time and with her hair properly done. The following day she arrived on time with a scarf over her head, then retired to the rest room for thirty minutes to do her hair. Unmistakeably, she responded to the negative reinforcement in ways that were more detrimental to productivity than if her hair had been left askew.

3. The recipient may exhibit escape behavior toward the negative reinforcer. Either Judy or Chuck, or both, may choose to absent themselves from their workplace for a measured period of time in response to the negative reinforcement.

Some years ago I was called in by a government agency to look at a situation that existed in one of its major departments. Somehow, there had crept in an unwritten, but organizationally accepted, rule that if an employee was “chewed out” by his or her supervisor, they could take the remainder of the day off with pay and without deduction from vacation or sick leave accrual. Our study showed that few “chewings” occurred in the afternoon and the preponderance before ten a.m. It also revealed that virtually all personnel below the supervisor level had been disciplined over a six month period; some as frequently as once a week! Fire them all, you say? Why? Productionwise, that would be like decapitation to get rid of dandruff. Even if it had been possible to do so, the replacements soon would have adopted the rule. The System was the culprit. The employees merely responded to it in ways that were rewarding for them.

Also, Judy or Chuck, or both, could return to their desks, gather their personal belongings about them, and fade from the scene, never to return. “What? Over a little thing like this? People don’t act that way,” you say. I agree that such an action is unlikely, and childlike; but look at the next consequence.

4. The parent evokes the child. When Fred Manager accosted the couple he showed his Parent.
ego state, his judgmental self, to Judy and Chuck. He used his status position to behave toward them as a critical parent would judge his children. Predictably, Chuck and Judy would use their Child ego states, their emotional selves, and their subordinate status to defend themselves in any way they could to reduce their sense of powerlessness. When Fred turned on his heels he abridged any possible continuance of the communication to a mutually satisfactory conclusion. Judy and Chuck were free to let their Child ego states have free rein. That spells danger for Fred Manager.

5. The recipient may exhibit avoidance behavior toward the negative reinforcer. Chances are that neither Chuck or Judy will be willing to engage Fred in any type of social or organizational intercourse for sometime to come. They are likely to avoid it until they observe some positive behavior toward them that may tend to diminish their avoidance feelings. These avoidance feelings may translate into such overt behavior as tardiness, absenteeism, personal business, etc. — anything to avoid the punishing atmosphere of the organization as much as possible. Of course, the avoidance behavior of Judy and Chuck may not escape the notice of other staff members. If they have been recipients of Fred Manager's criticism also, the entire organization is ripe for progressive lower productivity.

In my experience I have not observed an organization filled with negative reinforcement that does not have significant avoidance problems! Conversely, I have not observed a positive reinforcing climate that has avoidance problems in any great measure.

Not long ago a manager friend of mine challenged the above statement. From all that I could gather, his was an organization with a positive and rewarding climate. Staff members were loyal and supportive to the manager, to each other, and to the work of the organization; productivity was good; still, avoidance behavior in terms of absence from the work place was unusually high. After extensive discussion and examining I was about to concede my hypothesis in terms of this organization when the manager's secretary restored it for me. "This organization is a positive island," she explained, "surrounded by a sea of negativism" (meaning the larger operation of which my friend's organization was a part). "Much of the time," she continued, "crossing that negative sea to reach this positive island just isn't worth the bother." Touche! The penetrating negative vibes from the larger organization tended to diminish the involvement climate my friend was striving to achieve.

6. Negatively reinforced behavior may be only temporarily suppressed. Saxphot and Lathario may unconsciously observe Fred Manager's behavior for a time to determine if and when the time is right for another water cooler episode. Each time it is tried, Fred's behavior must be overtly consistent — shoo them away from the cooler. One slip of a shoo may be interpreted as Fred's accepting the propriety of the episodes. Those of us who raised children have played this extinction role many times, frequently on the short end.

7. The negative reinforcer may be perceived as positive in the mind of the recipient. Conceivably, Lathario's need for the attention of fair Judy may be satisfied by Manager's action. In Chuck's view, it legitimizes his male prowess, at least as far at Judy is concerned. If he can lure Judy back to the cooler for more put-downs by Manager, he might earn the longed-for right to bolder advances. Yes, dear Reader, this may sound far-fetched, but the point is that if Manager wants to criticize Lathario and Saxphot, he will be defeated, certainly, if he chooses an instrument that is perceived as positive by Chuck or Judy, or both.

A case in point here is that of a moralistic judge in one of our western cities who attempted to eliminate prostitution in his jurisdiction by doubling the fine on a hooker each time she was busted; $100 for the first time, $200 for the second, $400 for the third, and $500, the maximum the law allows, for the fourth time. All ladies of the night doing business in the area for any length of time had been fined the $500, but few after that. Why? The $500 bust was the entrance fee to the "ranks of the professional!" What was criticizing to the good judge was rewarding to the hookers. Failure to perceive what "turns on" a criticism recipient has back-fired on many a Fred Manager. In business, managers usually believe that what charges their generators also charges the generators of those who report to them.

8. The criticizer may be modelling behavior that is undesirable to him in the recipient. Chuck and Judy may have observed Fred lingering over the water cooler with other people from time to time. They, therefore, assume that such behavior is acceptable for them. To discover that it is all right for Fred but not for them leaves Mr. Manager vulnerable. They may be reluctant to confront Fred with his behavior, but the entire office staff will get it in both ears. Of such are negative climates developed. Do I hear "foul," dear Reader? You say that Fred probably talks business at the cooler while Judy and Chuck were enjoying a social relation that is far removed from production. Of course, you are right. You or I, however, are not the judges of Fred's modelling; Chuck, Judy, and those who listen to them are the S.A.V.E.
judges. Want to bet how many of them cry “foul” and defend Fred? I could get rich that way.

9. The criticizer may lose leadership power through the victor-vanquished syndrome. Judy and Chuck may retreat from the water cooler to their desks and lie wounded in their shields; two more martyrs to Manager’s power plays. The wounds of indignity pour out the increasing powerlessness they feel in controlling their own organizational destinies. Crushed is another way of putting it.

Power is soon lost when the power figure dispels his or her power in trivial circumstances, or against those who have little power to oppose them except in trivial situations. Fred may remain the organizational leader of his department for some time to come. If this case is typical of his office behavior, however functional power is probably passing or has already passed elsewhere in his organization. Fred’s career will not be helped by this. I have often told students in my university classes that subordinates are seldom in a position to help the manager in his or her vertical career climb. Managerial promotions are not made that way. Subordinates, though, frequently have the power to exercise a manager’s career ambitions.

10. Criticism seldom includes a definition of what the desired behavior is. When Fred Manager issued his admonition about the couple’s aberrant behavior, he assumed the responsibility for defining what is deficient in their behavior, to their understanding, and what they need to do to be productive from Fred’s viewpoint. For all he knows, the liaison of Judy and Chuck may have been work oriented; they may have been on a break after toiling over a hot deadline; or they may be catching a breather before tackling assignments that are not yet ready for their attention. Had Fred inquired about the why of their water cooler malingering, you can bet he would have gotten a reason something like one of the above. Since he did not, Fred now has egg on his face, whether he knows it or not. No person is likely to own up to being a slacker – not so long as a reasonable excuse, real or fancied, is handy. These excuses will be implanted in the ears of all office personnel who are willing to listen, which means all of them.

In Fred’s haste to terminate his discomfort in confronting the couple so that he could once more be comfortable, he failed to state what was wrong with their behavior. Who says they can’t dawdle at the water cooler? Is there a Company policy against it? Is it dangerous? Is it bad public or customer relations? The fact seems to be that Fred Manager, impulsively, just did not like that specific behavior at that specific time. This was not clear to Lathario and Saxphot. As long as it was not, the couple are free to assume whatever they wish about Fred’s motivation in the confrontation. One thing for sure, they will not give Fred kudos for courage.

Needless to say, Fred neglected to identify what specific behavior would contribute to the work at hand. Failure to do this left the couple confused as to what they should now do. Their next behavior may be as unproductive as the water cooler conversation and, in addition, a bunch of energy will be burned up in their hostility toward Mr. Manager.

11. The criticized may become offensive. Fred Manager could get his nose rearranged by Chuck, by Judy, or by both. This consequence may be obvious but it needs to be mentioned. Recent studies show that violence in the subordinate induced violence. Bodily harm perpetrated on school teachers for the past decade or so is now establishing itself in the business world. No longer can quiescence be predicted as a consequence of criticism, if it ever could be.

CONCLUSION
These consequences, I concede, are probably not all that may be served up to Fred Manager. You, the reader, may wonder why I did not mention one you have in mind. Feel free to write it down and add it to the list. To paraphrase the good football coach, “In management, when criticism is given, at least eleven things can happen and ALL of them are counterproductive and demotivating.”

Some of you may wonder why I have not discussed “constructive criticism.” That phrase, in my opinion, is a contradiction in terms. Criticism is always negative to the criticized. It is constructive only in the eyes of the criticizer. The term is used to rationalize the negative reinforcement.

Fred Manager probably rationalized that he was acting in the best interests of the organization and in the best interests of Judy and Chuck. A fair analogy strikes me that when my father took me, as a lad, to the “wood shed” for a stropping session, he always pointed out that it was for my own good and that what was about to happen would hurt him more than it would me. Had he inquired he would have been surprised, I think, at the schism between our perceptions of the consequences.

You may justly “hoist me on my own spear” for violating Consequence 10 – “Criticism seldom includes a definition of what the desirable behavior is.” I belabor poor Fred Manager without giving him a “leg up.” To this I plead guilty. Fred’s behavior that would contribute to a productive and motivating climate in his organization is as dynamic as the use of negative reinforcement presented here. It deserves a treatise of its own. I have the title already — The Power of Positive Reinforcing.

S.A.V.E.
Part I: Developing The Approach

The Collins Divisions of Rockwell International Corporation have gone through a definite growth period in recent years. This growth had resulted in a significant number of personnel placed in managerial positions without sufficient supervisory and technical experience.

With this situation in mind, Collins, in 1960, authorized the establishment of a Manufacturing Improvement Program, later changed to Management Improvement Program. It was intended that this program would improve the balance of the cost, schedule-quality factors in performance of manufacturing operations.

In response to this authorization, Collins Divisions management proposed a program which would:

- clarify the status and responsibility of supervisory management from division head to foreman.
- Provide a cost control course for management to direct its action toward achieving a balance of the price, delivery, and quality factors.
- Provide a program through which supervisory management can submit ideas to improve price, delivery, and quality.

The Management Improvement Program was initiated in the belief that finding a better way to accomplish any task generally results in a cost improvement.

The Management Improvement Program (MIP) is designed to improve technical and managerial skills of manufacturing foremen and superintendents. As a result, management action will be strengthened, achieving a balance among price, delivery, and quality. All participants are encouraged to take Collins training in related subjects. This training will prepare supervisors to be more effective by:

- Increasing their working knowledge of administrative duties.
- Increasing their working knowledge of the responsibilities of a supervisory job.
- Motivating the supervisors to utilize this working knowledge.

Many MIP participants may have acquired the proper training in cost control-reduction techniques through outside courses. In addition, a formalized method for investigating and reporting cost reduction projects is presented in an MIP training course. This course is a prerequisite for participation in the...
MIP program. During and after completion of this training, supervisors are encouraged to use this systematic approach in searching for better ways to accomplish their goals. The search for better methods is made into an effective training program by the completion of P.D.Q. (price, delivery, quality) cost improvement projects.

During and after the completion of the cost control course, participants are encouraged to use this systematic approach in solving P.D.Q. problems. The systematic approach, as taught in the formal Management Improvement Program training sessions consist of the following steps:

- Select a project
- Get the facts
- Determine the causes
- Define the problem
- Think up ideas
- Investigate/evaluate
- Select the best idea
- Sell
- Install
- Follow up

The following depict the above steps and illustrate this approach. In addition, several checklists have been added which will prove useful while surveying an area.

Developing solutions to problems requires creative thinking. Creative thinking is developing constructive ideas through applied imagination.

No committee, group, or seminar ever had an idea. All IDEAS originate in the minds of individuals.

The Collins training program establishes the methods to be used in applying improvements in one or more of the following ideas:

- Quality and reliability of our products.
- Delivery of our products.
- Conservation and utilization of time, equipment, and supplies.
- Elimination of clerical or paper work.
- Reduction for repair and maintenance costs.
- Elimination of hazards to personnel and equipment.

A refresher course may be held for those participants who graduated from Collins training more than two years earlier. The P.D.Q. methods and experience gained by the participants in the practice of MIP/P.D.Q. are reviewed in the refresher course. Any supervisory member from the areas affected, who has the proper training from either outside or inside Collins courses, is eligible to participate in the MIP program.

Each month, MIP/P.D.Q. participants who have had P.D.Q. projects submitted and installed in the previous month are invited to attend a Pivot Club* recognition luncheon. Major department heads attend this luncheon in recognition of participation by their respective departments. In addition, the luncheon is attended by division directors of the participating supervisors. Following the luncheon, a brief review of program progress and achievements is presented by the MIP Administrator or a master of ceremonies. This followed by a speaker presenting a topic normally related to some phase of Company business and activities, at times a speaker is brought in to discuss community problems or what is going on in the community.

As a means of providing additional incentive for program participation, a P.D.Q. trip is awarded twice a year to a selected number of program participants. Trip award winners are selected on a basis consistent with MIP/P.D.Q. criteria and training. A manager or supervisor may also be selected for trip awards. Their selection will be based on their contribution to the program as shown by the participation of the employees under their supervision.

Additional awards and recognitions are instituted as necessary to provide added motivation. Award plaques (or trophies) are given in formal recognition of the highest participation in special categories within a specified period of time. These awards are given to the department managers at the Pivot Club luncheon.

The MIP/P.D.Q. Program is administered by the Management Improvement Program Administrator. His general responsibilities include:

- Contacting various levels of management to discuss progress.
- Discussing specific projects and problems with program participants.
- Preparing reports which are distributed to management.
- Fostering and promoting various activities to assure interest in the MIP Program, such as the selection of P.D.Q. trip sites and trip arrangements. The selection of trip award winners is determined by the Program Administrator with the approval of appropriate management personnel.
- Maintaining P.D.Q. project files. Projects are filed in a “suspense” file by major division/minor department in project number order.

*S.A.V.E. As described in Websters
A person, thing or factor having a major or central role, function or effect.
SELECT A PROJECT

The most effective way in which new ideas are created is through the application of a questioning attitude; the Systematic Approach. The first step in the systematic approach, is also one of the most important. Worthwhile P.D.Q. projects result only when instigated to solve serious cost problems. All of the cost problems, directly or indirectly within your control, are made up of five factors: labor, material and supplies, tools and equipment, plant and space, and utilities and services.

Program experience has proven that the MIP/P.D.Q. survey sheet, Figure 1, the use of which is detailed in foreman training, is still the most reliable in selecting the project which should be given No. 1 priority. Establish and maintain their own sheet by surveying their area and listing their most serious problems.

Discuss these periodically with their supervisor so that an agreement is reached on priority assignment. Then follow the P.D.Q. discipline to solve the selected problem.

The following checklists will prove useful while surveying their area for problems.

P.D.Q. checklist

**Direct and Indirect Labor**

What jobs or operations do I have that:
- Are costing more than they were estimated to cost?
- Are subject to frequent complaints.
- Are usually rejected in inspection?
- Require rework?
- Are always behind schedule?
- Usually require special followup to meet schedules?
- Require my personal attention each time they run?
- Require many records?
- Have such close tolerances they keep me in "hot water" each time they run?
- Need an operator with long experience to run satisfactorily?
- Require unusual concentration by my operators?
- Require a large percentage of inspection time?

P.D.Q. checklist

**Material and Supplies**

What jobs or operations do I have that:
- Use large amounts of material? Use expensive material?
- Use materials that are difficult to work with?
- Use many different kinds of materials? Use same material?
- Require an unusual amount of supply items such as gloves, sandpaper, brushes, etc.?
- Use Materials that are frequently unavailable or hard to get?
- Require such things as frequent drill sharpening, tap changing, etc.?
- Need special material or supplies to run?
- Are similar or identical but made from different materials?
- Use hard-to-account-for materials and supplies such as rivets, masking tape, etc.?
- Require getting more than one part out of a piece of material?

P.D.Q. checklist

**Tools and Equipment**

What jobs or operations do I have that:
- "Tie up" my most critically loaded machine or work station?
- Frequently require overtime?
- Have frequent tool or machine breakdowns?
- Require special tools or equipment to run?
- Run on equipment requiring cleaning, adjusting, etc., on weekends or overtime in order to maintain schedules?
- Run on old or antiquated equipment?
- Run on equipment requiring frequent adjustment to keep operating?
- Run on single purpose, low utilization equipment?
- Require complex, improvised setups in order to be run?
- Require high cost production equipment for relatively short runs?
- Require my operators to do machine-like operations?
- Have successive operations of a very similar nature?

P.D.Q. checklist

**Plant and Space**

What jobs or operations do I have that:
- Remain in my department for long periods of time?
- Produce a lot of bulky parts requiring storage before, after, or during the run?
- Are run in permanently set up, infrequently used equipment?
Figure 1 Forms - Management Improvement Program
2. Get the Facts.

You can’t solve a problem unless you understand and have all the facts concerning the present method. A new way, or different solution, requires a new or different combination of bits of knowledge. A new combination is impossible to achieve without these bits of knowledge.

Knowledge means having the facts.

Facts can only be obtained by asking the following five questions: What Why? When Why? Where Why? Who Why? How Why?

About the present:
Labor
Materials and supplies
Tools and equipment
Plant and space
Utilities and service

Bear in mind that a network of knowledge is required before you have all the facts.

3. Determine Causes

Having the facts is necessary for creativity, but understanding the reason behind the facts is necessary to develop sound ideas.

Understanding the reasons comes from asking Why? of all the facts that you have already established. For example you might need to know:

What labor is used –
Why do we use that classification?
Where is the labor used –
Why use in that location?

What material is used –
Why use these specific materials?
How are the tools delivered –
Why delivered that way?

4. Define the problem

In order to be effective, creativity must be directed at a specific problem. Defining the problem requires:

Establishing specific objectives that your solution must accomplish and determining the conditions which your solution must fit. There are probably certain requirements or mandatory restrictions over which you have no control, but within whose perimeters your solution must remain.

You have now completed four steps of the systematic approach and are ready to be creative. Let your imagination run free. Don’t stifle creativity by being critical. At this point your mind is like a parachute, it only opens when used. Proceed and –

5. Think up ideas.

Ideas that improve the price, delivery, or quality aspects of Company operations result from asking questions that suggest alternatives. The more the better. You can use the same basic five questions, now adding “else”. For example:

| What else | Labor |
| Where else | Material |
| When else | Tools |
| Who else | Plant |
| How else | Utilities |

End of Part I.
Part II continued in September/October issue of Value World.
Suggestion Program Administrators often do not know how to effectively get employees to submit ideas. Just look at your Suggestion Program to see the reasons why.

The typical Suggestion Program involves the noble concepts of setting objectives, doing reports, determining eligibility, granting cash awards and obtaining the support of staff and line management. Publicity is given. Results are evaluated in terms of costs and benefits. Employees are informed and invited to participate in the program.

These operational aspects of the program are important but are overemphasized. No real effort is made to stimulate employees to submit constructive ideas. Aggressive idea stimulation is almost totally lacking in most organizations consequently, little effort is really made to encourage employees how to think and analyze their ideas. The result is that the inherent creativity of the workers goes untapped.

We must actively seek ideas by having a positive Suggestion Program. Attention must be focused on how new ideas can be born and new methods originated, analyzed, and developed to obtain a more effective and efficient organization and to permit greater employee self-actualization.

Suggestion Programs provide us with an excellent vehicle for this to happen. The following guidelines are useful in molding a successful Suggestion Program.

Establish a climate conducive to problem solving. Stimulate imagination. Develop a team spirit. Understand people. Support innovation. Encourage employees to be cost conscious. Encourage employees to reduce waste and increase production. You can do this these ways.

- Use promotional material effectively, i.e., posters, flyers house organs, etc.
- Dramatize award cases that have tangible dollar benefits.
- Identify and publicize problem areas in which suggestions are wanted.
- Promptly evaluate a suggestion and give a suggester an interim reply if the suggestion takes longer than a month to evaluate. Get top management fully committed to provide the manpower and money needed to accomplish this. Evaluate the results of the achievements regularly to top management.
- Be sure that proper recognition is given to both innovators and their supervisors.

Attack problems through an organized problem solving approach or by brainstorming. Remove blocks to creative thinking. These blocks may be perceptual, cultural, and emotional. Bring out the maximum creativeness in people, provide employees with a check list for developing new ideas, and rate the performance of supervisors on "innovation responsibility."

The above techniques and concepts to stimulate ideas are discussed in this article. One way, for example, to stimulating suggestions is to encourage group meetings where an organized problem solving approach is used. Below is an organized problem solving approach that has been covered in the pamphlet, Guide for Creative Change.

Below is an eight-step organized approach for solving analytical and creative-type problems. Pointed comments are used in each step to aid the in-
individual or group in freeing the mind of thinking habits which limit creativity.

Step I Define - Determine the true nature of the problem. Eliminate misconceptions and determine any other related problems.

Step II Prepare - A good store of facts related to the problem, along with general information and past experience, is a valuable reservoir of material for creative activity. Flexibility in applying this information is necessary.

Step III Analyze - To avoid misconceptions, openmindedly consider all aspects. To critically evaluate a problem thoroughly analyze it.

Step IV Imagine - Emphasis on imagination unlimited. Lift oneself out of one’s mental ruts. Discard any preconceptions or biases. Check creative blocks to insure against negative thinking. Adopt the attitude that everything is possible and will work.

Step V Incubation - Letting up on effort in order to invite subconscious thinking. If imagination fails us in Step IV, two courses of action open are (a) continue to bump one’s head against a stone wall, hoping for a creative solution, or (b) let up temporarily, invite the subconscious mind to take over (incubation).

Step VI Conclude - Put the pieces back together. The more intelligently a problem is picked to pieces, the more likely it is that the pieces can be rearranged or combined into new ideas for a creative solution. Remember, the whole is not equal to, but greater than the sum of the parts. The “Need” or function has been added which was the purpose of solving the problem.

Step VII Evaluate - Where several possible solutions exist for a certain problem, a process of evaluation is required to obtain maximum objectivity and eliminate personal opinion. This feasibility study should be made by personnel other than those who originated the idea, and should be based upon and include:

- A list of criteria that may affect each solution; e.g., cost, profit, safety, time, “need,” etc.
- An evaluation of each possible solution against these criteria to determine which solution yields the greatest total benefit.
- Select the best solution for the test.

Step VIII Test - Make sure the solution works. Testing is the purest form of verification.

While using this organized problem-solving approach, you have to remove the blocks to creative thinking. See Figure 1.

<table>
<thead>
<tr>
<th>A. PERCEPTUAL BLOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>● A preconceived rule of conduct</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>B. CULTURAL BLOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Environmental effect of home, school and industrial life</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>C. EMOTIONAL BLOCK</th>
</tr>
</thead>
<tbody>
<tr>
<td>● Influence of ones feelings or passions</td>
</tr>
</tbody>
</table>

Figure 1: Blocks Inhibiting Creativity.

BRAINSTORMING
Another good technique for solving problems by Group Dynamics is Brainstorming, developed by Osborn.

Much of the success of “brainstorming” rests in following a few simple rules. The leader and group should be thoroughly familiar with these rules and willing to abide by them. These rules are:

- TEAM EFFORT - Input from several backgrounds
- EVERYTHING GOES - (Freewheeling)
  Turn off judicial mind
  Turn on Creativity
  Don't hold back
  Go for quantity not quality
- FORCE IDEAS - Set minimum time
  Set idea Quota
- JUMP ON THE BANDWAGON - (Hitchhike)
  Modify or expand previous idea

S.A.V.E.
Some helpful hints in conducting the sessions follow:

1. Limit group
   Ideally, the brainstorming group should not exceed 10 persons nor be less than 5 persons.

2. Select members
   All members of the group should have some background information of previous experience with the problem. This should vary from a couple of "experts" on down to a few people with only a speaking acquaintance in the area.

3. Designate leader and recorder
   One member of the group should be designated as the leader, and another as a recorder.
   a. The leader is the critical factor in the whole procedure. He must have the respect of the group, not necessarily as an expert on the particular problem, but as an accepted leader. He must have all the skills of a good conference leader.
   b. The recorder puts down all ideas, even ones which seem to overlap, on a board or chart in front of the group. He is also free to contribute his own ideas at any time.

4. Allot time
   The time allotted for the brainstorming session must be variable. The length of time that can be spent profitably will vary widely with the nature of the problem and the group itself. As a rule of thumb, one hour is probably the minimum time and about two hours the maximum.

**BRING OUT CREATIVITY**

When you have established an open creative environment, you will face problems in supervising creative employees.

Effective supervision of creative employees requires understanding the nature of creative persons and the deterrents imposed by supervision are absolutely necessary, such as a plan of organization and the associated schedule of target dates for the project completion.

The following is a list of guides for supervisors in bringing out maximum creativeness in people:

1. Build an atmosphere which encourages new ideas and changes.
2. Give the creative worker a proper environment in which he can try out his ideas.
3. Be a good listener.
4. Give commendation and recognition for new ideas when deserved.
5. Actively support and encourage creative activities.
6. Maintain effective communications.
7. Be fair in considering ideas.
8. Keep routine work away from the highly creative person.
9. Have several problems waiting ahead. This way, the creative person keeps thinking of the new jobs and tries to finish the old ones.
10. Know when to take a problem away. This requires great skill and judgment by the supervisor. Take the problem away when the worker is losing interest or when his changes are postponing the completion of the idea too long.
11. Let him know when ideas are wanted in connection with particular problems.

**CHECKLISTS**

Checklists are a good means of stimulating ideas and will help insure the broadest coverage of creative thought relative to the problem at hand.

Several groups and types are available; one example follows:

1. Can the dimensions be changed?
   Larger - smaller - longer - shorter
   -thicker - thinner - deeper - shallower
   -stand vertically - place horizontally
   -make slanted or parallel - stratify - invert (reverse) - crosswise (bias, counter) - converge - encircle - intervene - delineate - border

A different approach might be to ask question similar to checklist fashions, such as:

1. If it is done on a desk, can it be done on the floor - or somewhere else?
2. If it is done by people, can it be done by machines, e.g., by photostat instead of handcopying?
3. If it involves filing, can the procedures be changed so that it can be thrown away?

Finally rate the performance of your supervisors on innovation responsibility. Cost reduction and profits are geared to innovation. Part of your supervisor's performance evaluation based on innovation responsibility will result in increased productivity and employee job satisfaction.

Make ideas work for you by using these techniques and concepts. Be totally committed to stimulate your employees to produce ideas. The operational aspects of a Suggestion Program remain important, but ideas make things happen.
Value Engineering In Army Development Contracts

by
Herbert Steiner, CVS

What's happened to Value Engineering in development contracts?
What's happened to Value Engineering?
What's happened to Value?
What's happened?

With all the emphasis on words coming from high level Government officials on simplicity of design, reducing cost, design to cost, buying only what you need, no frills, minimum life cycle cost, and many more, the most lucrative area for accomplishment is being largely ignored. The use of the Armed Services Procurement Regulation (ASPR), Value Engineering Program Clause in some Defense Department development contracts has not been fully understood, implemented or integrated into the system. It has been underrated and overlooked as a primary method to buy equipment at reduced cost. Properly implemented, the VE program clause is a powerful weapon with which to attain maximum value.

Let's define what we're talking about when we say "VE program clause." This is the clause (7-104.44(b)) referenced in ASPR SEC I part 17 paragraph 1-1702.3. It is a mandatory requirement stated as a line item of the contract specifying the number of hours of VE required and the dollars to be paid for performance. In addition, there are specific provisions and requirements in specification MilV38352, for accomplishment and reports to be furnished.

It should be noted that at this phase of the development cycle, there is no inventory to deal with, no Technical Manuals to be changed, no modification work orders to be applied, no production drawings to be changed, no provisioning changes and no procurement data package changes. We are already in advance of any engineering change costs!

There is much data from US Army Electronics Command (ECOM) of the Defense Department to prove our point. ECOM was selected because it is part of the author’s task as Chief of the ECOM VE Division.

There are impressive data available which is well documented and goes back at least 5 years. Let's, however, deal with the here and now, the last complete fiscal year (FY-75), since the same philosophy basically holds true for prior years.

At the start of FY-75, there were 17 development contracts containing VE program clauses, Figure 1.
### Item | Contract Cost | VE Hours | VE Program Cost
--- | --- | --- | ---
Radio Set URC-78 | $1,711,790 | 2000 | 29,425
Tactical Landing System | 4,796,000 | 2000 | 49,000
Artillery Locating Radar AN/TPQ-37 | 1,408,701 | 2000 | 39,864
Artillery Locating Radar AN/TPQ-37 | 1,408,701 | 2000 | 48,981
Lightweight Laser AN/PAQ-1,PO AN/UAS 8 | 1,423,000 | 1000 | 22,800
A/B Laser Tracker AN/AAS -32 | 1,875,792 | 1000 | 17,787
Time Digital Data Multiplexer TD-1069G | 984,000 | 1500 | 44,918
High Speed Serial Data Buffer TD-1065G | 751,514 | 1500 | 26,789
Hot Brick OV I | 2,730,000 | 1000 | 27,5000
Band IV Head | 574,740 | 2000 | 15,273
Bancroft I | 1,000,000 | 2000 | 40,000
P D D R MX-9331 | 582,241 | 2000 | 30,332
MIRID AN/PSS-10 | 252,856 | 1000 | 28,968
Mobile Mortar Locating Radar AN/TPQ-36 | 8,596,613 | 2000 | 65,989
Megabit Digital Troposcatter Subsystem | 1,975,882 | 2000 | 27,500
Tech Control Center AN/TSQ-84 | 585,000 | 1000 | 12,606
Multews | 2,159,287 | 2000 | 61,000

**Figure 1**

Development Contracts with Value Engineering Programs

How did these specific contracts get VE program requirements? Candidates for VE Programs are developed using various sources of information concerning future procurements. Some of these sources are:

- Budget Input Requests
- Procurement Work Directive
- Engineering Program Reviews
- Specification Reviews
- Advanced Procurement Plans
- Contracts with Laboratory personnel

Decision to include a VE Program is made based upon the following factors:

- a. Production quantities involved
- b. Cost of R&D contract (usually over \( \frac{1}{2} \) million dollars)
- c. Stage of development
- d. Cost reduction potential-feasibility of incorporating VE changes
- e. Life cycle cost of project

After decision has been made to include a VE Program a PWD package for VE is prepared and forwarded to the project engineer. The package includes line item description for the VE program with man-hours specified, the Data Requirements (DD Form 1423), a list of evaluation factors for the VE portion of the proposal, a cost estimate for the VE program, and a point of contact for any additional assistance that may be required.

After contract award, a visit is made to the contractor to explain the VE program and data requirements. The contractor's proposed plan of operation is reviewed and sug-
gestions made to improve any weak areas. The contractor is advised on approaches to follow in identifying high cost areas that are the best potential areas for reducing cost. A functional work breakdown structure with costs is a useful tool in this area. The training of the assigned Value Engineer is reviewed and if VE training is required it is recommended.

What have we the Government bought? On each of these contracts the Government has contracted to buy hours of value engineering and quarterly and final reports.

Quarterly Reports are reviewed and evaluated. Questionable areas are resolved with the contractor. If progress is not satisfactory, a plant visit is made to advise and assist the contractor on improvements. Plant visits are made as required to assess progress on site.

The Final VE Report (draft) is reviewed and corrections or additions are requested when required. The Final VE Report is distributed to all functional areas with an interest in the project. In some cases there are potential changes that could not be incorporated during the development and these are brought to the attention of the project manager, project engineer and production engineer for consideration and inclusion in the data package for the next procurement.

What were the results of our programs completed in FY-75 and did we get our money's worth? What was the return on our investment? The chart in Figure 2 shows the ROI on the instant contracts only. An average of 250 percent return on these development contracts where we are buying only small quantities to prove out feasibility, performance and operation. These savings are increased many fold when the item actually goes into production and quantities are greater. The unit savings will then apply to the future quantity being purchased.

We have an example of just such a situation during fiscal year 1975. The Key Generator KG 27, was developed with a Contractual VE program costing $48,000 and was a part of the FY-68 program. The item was subsequently bought in FY-75 at a production savings of $2.7 million; a substantial pay-off and is typical of examples occurring in past fiscal years.

Let's see what's happening to this "primary process," referring back to ECOM to see the growth in use. In FY-72, eight new development contracts were issued with the VE program clause; in FY-73, eleven new development contracts; in FY-74, three and in FY-75, only one, in spite of Procurement Work Directives for inclusion of VE programs in eight development contracts. To date, none have been issued in FY-76.

Investigating we have found that funding is not available to pay for VE now, where savings can be generated downstream.

This is no new problem and has existed since the

<table>
<thead>
<tr>
<th>Item</th>
<th>VE Program Cost</th>
<th>Instant Savings</th>
<th>Future Estimated Saving/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>AN/TRQ-33</td>
<td>$49,000</td>
<td>$252,308</td>
<td>2,413/Ground Set</td>
</tr>
<tr>
<td>Tactical Landing System</td>
<td></td>
<td></td>
<td>1,560/Airborne Set</td>
</tr>
<tr>
<td>TD-1065</td>
<td>26,789</td>
<td>661,324</td>
<td>1,348/Unit</td>
</tr>
<tr>
<td>Buffer High Speed Serial Data</td>
<td></td>
<td></td>
<td>1,504/Test Set</td>
</tr>
<tr>
<td>TD-1069</td>
<td>44,918</td>
<td>30,976</td>
<td>698/Unit</td>
</tr>
<tr>
<td>Time Division Digital Multiplexer</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AN/URC-78</td>
<td>29425</td>
<td>5,871</td>
<td>773/Unit</td>
</tr>
<tr>
<td>Radio Set</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Band IV Head AN/GRC-103</td>
<td>17,787</td>
<td>64,190</td>
<td>3,005/Unit</td>
</tr>
<tr>
<td>TOTALS</td>
<td>$167,919</td>
<td>$499,407</td>
<td></td>
</tr>
</tbody>
</table>

INSTANT ROI 2.5

Figure 2

VE Program Results - Near Term Savings
Fiscal 1975

S.A.V.E.
McNamara era where thought was given to returning part of the savings to the activity initiating the VE action.

The truth is that, without designating funds to pay for VE programs and VE actions, DoD will never realize the tremendous potential of VE to save funds and reduce the cost of its equipment.

The solution is simple. It is time to change the old funding concept, which has not worked, and initiate a new concept, one that will work.

The way to accomplish this action is to fund VE as a budget line item, a separate and distinct funding appropriation to be programmed on a cyclic basis. These dedicated VE funds will be used for:

- Salaries
- Travel
- Contract Programs
- VECP's/VEP's
- Models
- Testing
- Unsolicited VE Proposals
- VE Research

In other words, all costs of VE will be borne by this fund and will be so recorded and documented. As a result, it will now be possible to know exactly what the VE program costs and how the investment pays off.

In addition, records will be maintained by all activities of the savings resulting from these VE actions, both in the cost avoidance and hard savings area. With these data, the return on investment for the VE function can be determined annually.

Furthermore, the program will have an incentive and drive so that both contracting and Government personnel will be aware of the program and where funding for acceptable projects can be obtained. They will be motivated to apply VE principles.

In summary, VE is a process that requires management direction, funding and a high level of motivation. With funds available to implement acceptable cost saving changes, personnel will be supported and motivated to apply VE. We could then get personnel to believe, that as taxpayers, the dollar they save could be their own.

Joy Manufacturing Company is again sponsoring two awards available to SAVE members, to be known as:

A. The Joy Manufacturing Company Recognition Award of $1000
B. The A. E. Mudge Award of $500
Both awards include a suitably engraved Silver Bowl.

**REQUIREMENTS**

A. The submittal of a paper of approximately 1,500 words in length, double-spaced (with artwork if suitable) describing what the submitter believes is an outstanding example of cost effectiveness accomplished through the use of the Value Engineering techniques.

B. The example described must be implemented at the time the paper is submitted in the author's company (or organization) within the past year. This implementation must be attested to, in letter form, by an officer of the company (accompanying the submittal).

C. The subject must apply to any aspect in the Value Discipline; a new and/or innovative use, a motivational technique, a new approach or an outstanding project.

D. Multiple entries can be submitted; with one subject per entry.

E. **Originality, innovation and results obtained** will be key elements considered by the judges. The amount of dollars saved will **not** be a criterion to equalize the size difference of various companies represented.

F. Submitters must be members of SAVE at the time of entry.

G. The first page of each entry should contain the title, company name, author's name and (short) author’s biography.

H. All papers submitted will become the property of SAVE and they reserve the right to publish or otherwise distribute the papers as they deem wise.

**DEADLINE**

Three copies of each paper must be submitted and received on or before January 31, 1978. All papers for the competition are to be mailed to the SAVE National Business Office. The envelope should indicate "Joy Recognition Award."

**JUDGING**

The judges will be:

1. Jimmie Carter, President-SAVE
2. Jerry Kaufman, Immediate Past President SAVE
3. Art Mudge, Vice President, Joy Manufacturing Company

**WINNERS**

The winners will be notified in advance of the annual International SAVE Conference, and it is hoped that they will present their paper to those attending the Conference.

The winners will receive their awards at the annual Awards Banquet during the Conference.

Notes:

1. Employees of Joy and the Society's Board of Directors will not be eligible to compete.
2. If in the unanimous opinion of the judges, the quality of the papers does not meet the standards set forth above, they have the right to cancel the competition. Their decision will be final.
Value Analysis In Process Industries
by
Richard Horrworth

RICHARD HORRWORTH is a researcher, practitioner, and developer of problem solving strategies for experts to use with problems difficult either in their complexity, in the time constraints for solution, or in the nature of the problems for implementation and acceptance. In addition, he is president of OMR, Inc. in Washington, D.C. and Maryland, author of articles on energy, organization structure, planning, and problem solving, and co-author of a book on value management in construction for release in 1977. Mr. Horrworth began his development of value engineering and its application to process problems in 1963-1964 with Celanese and Union Carbide.
Value Analysis and Value Engineering have removed costs of 30 percent and more, improved throughput, developed new chemistries, and enabled industries to maintain their profit position in process operations as diverse as intermediate chemicals, synthetic fibers, citrus concentrate, smelting, industrial gases, and plastics.

The first total process plant to be value engineered was a cellulose acetate plant built in Mexico in 1963. In order, value engineering was applied in industrial gases (1964), polymers (1965), intermediates (1966), citrus concentrate (1966), uranium and coal mining (1967), vanadium and uranium oxide (U₂O₅) preparation (1968), and ferroalloys processing (1968).

These value projects represent total plants at conceptual stages in design to completed plants in states of redesign for greater throughput and efficiencies. All projects met or exceeded their stated objectives for value engineering. Above 90 percent of recommendations were instituted.

The latest in this series of process value projects is (1) the development of new chemistries to build both a monomer and a polymer and for the polymer. Two ways were found. Two plants were costed. Two were adopted. — in two days of value engineering/analysis.

Since these early beginnings, there has been interest in value engineering/analysis for process plants in Belgium, South Africa, and Italy.

### FIGURE 1. History of VA Application in Process Industries

<table>
<thead>
<tr>
<th>Product</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cellulose Acetate</td>
<td>1963</td>
</tr>
<tr>
<td>Industrial Gases</td>
<td>1964</td>
</tr>
<tr>
<td>N-Butanol Conversion</td>
<td>1964</td>
</tr>
<tr>
<td>Synthetic Fibers</td>
<td>1964</td>
</tr>
<tr>
<td>Polymers</td>
<td>1965</td>
</tr>
<tr>
<td>Intermediates</td>
<td>1966</td>
</tr>
<tr>
<td>Citrus Concentrate</td>
<td>1966</td>
</tr>
<tr>
<td>Vanadium/uranium Milling</td>
<td>1968</td>
</tr>
<tr>
<td>Ferro Alloys</td>
<td>1968</td>
</tr>
</tbody>
</table>

S.A.V.E.

All recommendations were adopted for a savings in dollars per plant constructed of 21 percent. At the time, Linde was building upwards of six such sized plants per year.

The methodology developed for value engineering this process plant was a first and remains important. The added methodology and some concepts, called 'value process analysis' and 'value process management'. VPA has worked well for 12 years now. It adds several concepts and methods to the information phase and to the creative phase of V.E.

This new value process was further checked out and refined with an n-butanol conversion plant in Texas in 1964. The pattern for this last effort and engineering could be applied to a total plant. I said, "Yes, if the plans and costs are made available and if I may select the team members." The year was 1963. The president of Linde announced that he would sponsor a value engineering workshop study of a Linde oxygen plant — if V.E. were tried somewhere else as a trial run.

The Celanese people said that they were desireous of building a cellulose acetate plant in Mexico and were looking for new technology and better ways to produce a lower cost-per-pound product. A team comprising but three people, only two of whom contributed significantly, developed a set of solutions for the plant design. One of the solutions proposed a "quick mix" process borrowed from the munitions industry. The team comprised three men trained in value engineering. One is a PhD in mechanics with a long history of major technical contributions and leadership in aerospace and military R & D. The second holds over 40 patents in electronics and rotating machinery and ran his own production firm. The third is a consultant in problem solving methodology and applications.

From this demonstration effort came evidence that convinced Mr. Goffe Benson, the Executive Vice President of Linde, to try value engineering on an entire oxygen plant. The plant selected was a "T-400", a four hundred ton per day liquid oxygen plant designed to service steel and copper producers.

The value engineering director in charge, Mr. Stanford Henry (now director of hydrogen products), selected 20 specialists in cryogenics, purchasing, production, and marketing. They were assigned in teams to study functional areas of the T-400: controls, chill system, compressors, structures, storage, and piping.

The teams worked in the same room, cross-checked their problems with other teams, redefined their projects, conducted project value work, and through review with the technical decision makers, synthesized the results, and prepared recommendations to Linde executives. Two company vice-presidents moved in and out of the project activity over the four days of the study.

Use only difficult, challenging projects.
Develop a full supportive climate.
Add selective, timed stress for each task force member and team.
Set strategy that channels group conflict.
Keep the problem-solving process straightforward.
Lay heavy emphasis on information gathering.
Teach creative methods beyond the usual buzz session/brainstorming.
Save all value training subject matter not directly related to the projects in study.

Further, the author found it vital to 'counterpoint' all technical people with other technical people drawn from the same company. This strategy ensures that the 'power of knowledge' residing in one man does not act to either intimidate other team members or to cause the key technical person to behave timidly.

There are many other factors to consider when working in the process industry that are not often applicable to hardware, software, structures, or organization value work. Here are a few of them.

1. A process is integrated. It flows. Our English language is a language of 'is's' and 'was's'. It is static rather than dynamic. We say, "The tree is green." Most who learn English as a second language view that statement to be odd. They know that "the tree is a plant. The tree grows green." It is the difference between a Baconian and an Einsteinian world. Methods in V.E. with processes must accommodate to the differences.

2. Process plants are developed from table-size 'test tube' arrangements and from pilot plants. It is almost entirely linear flow. Total plants house processes in turbulent flow. For that reason (and others) what actually happens in any given portion of a process plant is only imperfectly known and understood. Therefore, chemical engineers are conservative in their readiness to alter an established design that produces acceptable product. They feel somewhat differently if they can work with an all new concept.

3. Most chemicals are still marketed and 'sold' before the plant to produce the chemicals is constructed. That situation makes for a climate of great pressure on, and tension within, engineering. They feel the pressure. They hear, "the product is already sold. Every day we are not in production we are losing money!" and "we want to promote our production people."

Even so, the excellence one finds among chemical engineers and among other professionals in process industries tends them to quickly adapt and adopt value concepts as their own. They achieve dramatic improvements in costs, in time for construction, in quality and quantity of throughput, and in new, practical formulations.

All of the above are available so long as the value effort takes cognizance of the above factors and of this final one.

Select the best, the absolute best, people to participate in the studies. Ensure that the decision-makers are there for a large part of the endeavor and feel directly accountable for results of the project work. These decision-makers include people in technical, financial, marketing, production, and trade-off capacities. The projects must challenge. The prospective plant manager; the prospective plant engineer; marketing; the best available in production, in engineering, and in purchasing; a top level decision-maker; and an executive from the 'scapegoat' organization. Give them a language new to all of them (function analysis) and a few special methods and the added concepts of value process analysis. With these, value engineering will work remarkably well for them.

In the latest value process analysis effort, the projects were (1) to develop a new way to build 'x' polymer; (2) cost the plant; (3) develop and inventory of new production potential for the marketing organization. The following team composition did all of the above and, more, developed a second formulation to build the polymer and costed a second plant: the director of
R & D for new products in polymers; the plant manager of a current plant making the same prod-
cuct; his plant engineer; two project engineers from other polymer work; the chemist who developed the
then current way of making the monomer and polymer; the best overall chemist in a corporation of
80,000 employees; the head of purchasing; two men from marketing.

The on-site time to do all of the above work was
two days. Less. Over one-fourth of 14 hours was
given over to gathering and sharing information
about the then process, plant, equipment and costs.

This kind of value process analysis works equally
well on all processes: from molten ore and uranium
leaching to orange juice concentrate; from plants for
polyethylene, for formaldehyde, and cryogenic fluids
to coal mining. Moreover, this author's experience,
with the participant professionals, is that they en-
dorse and use V.P.A./V.E. and enjoy their ac-
complishments. This pleasure seems to be manifest
even when the need for results and the complexity of
the challenge are unusually high.

Value engineering/value analysis has entered
fields beyond those identified above to include phar-
maceutical industries (pioneered in Abbot
Laboratories in 1971-1972 by R. Glenn Woodward),
water treatment and sewage disposal
(pioneered with EPA by Hal Tufy and Alphonse
Dell'Isola in 1974) and explosives manufacture
(pioneered in munitions plants with Day and Zim-
mermann by Charles Ferguson and Carl Wilson in
1974).

Value process studies can be expected to one day
include atomic reactor systems for the purpose of
improving safety and reliability and total energy
systems to improve efficiencies, conservation and
cost. Even now, energy system studies are run with
federal buildings to improve conservation. Value
will increasingly look to issues other than cost to
help process industries and industries employing
some process operations develop new excellence.

In that brief twenty years, we have seen process
operations grow from hand and mind mathematics to
computer-mind mathematics. We have seen the
development of logics that gratify us all. And now we
are seeing that the non-logical applications of small
groups of men bring new imagination and value to
the investments in computer logic. This latter is a
natural home for value engineering. It will continue.

Although it seems a long time from this author's
first exposure to a small 'process plant' called the
B-2a booster engine for the Atlas missile to helping
add to the capacities of those building families of
chemical plants, it is but the beginning for the value
process analysis.
The Richard B. Demars Award

The Society of American Value Engineers has accepted a $1,000 sponsorship award from Richard B. DeMars, President of Geupel DeMars, Inc., for the best paper portraying value engineering excellence in construction.

OBJECTIVE
The objective of this award is to promote the formal use and application of the value engineering technique in the construction industry. In the sponsor of this award encourages employees to perform and submit pilot value studies for their clients or supervisors.

It is intended that the process of presenting value changes to a higher decision level, gaining approval for the value change, and seeing it through to implementation, will demonstrate the effectiveness of the VE technique and stimulate management to consider more formal application within the organization.

ELIGIBILITY
Competition for this award is open to the general public for those who participate as a member of a value study team or otherwise perform a value study, not those who manage or approve the study effort.

PAPER REQUIREMENTS
1. Contestants shall submit a paper, approximately 1,500 words in length, double spaced (with suitable artwork), describing what the submitter believes is an outstanding example of value engineering, implemented either during design or construction of a facility.

2. The example described must be implemented within design or construction documents that have been placed under contract within the preceding year.

3. The key elements to be considered in judging the paper and selecting the winner are:
   a. Content showing how function was considered.
   b. Content showing how necessary performance and quality was maintained or improved.
   c. Originality, innovation, and results obtained will be important, however, the amount of savings will not be a selection criteria.

4. The first page of the paper should contain the title, author's name, author's company and position, and short author biography. It should also identify the example, the project on which it was implemented, and the client, designer and constructor (if known).

5. The paper must be accompanied with evidence or certification of implementation of the described value engineering action. The validity of the subject described can be attested to by a company officer of the submitters firm, the original designer of the facility, the owner of client for the facility, or by before and after copies of the facility contract documents.

OTHER CONTEST RULES
1. Multiple entries can be submitted, with one subject topic per entry.

2. All papers submitted will become the property of the Society of American Value Engineers which reserves the right to publish or otherwise distribute the papers as they deem appropriate.

3. The contest judges reserve the right to cancel this contest should there be insufficient responses or qualifying papers.

4. The following personnel or employees will not be eligible to compete for this award: employees of Geupel DeMars, Inc., designers or contractors associated with any project managed or constructed by Geupel DeMars, Inc. used as a value engineering example, the Board of Directors of the Society of American Value Engineers, and the contest judges.

DEADLINE
Three copies of each paper must be submitted and received on or before January 31, 1978. All papers for this competition are to be mailed to the SAVE National Business Office, 29551 Greenfield Road, Suite 210, Southfield, MI 48076. The envelope should indicate “DeMars Award.”

JUDGING
The judges will be:
1. Charles W. Kinsley, Vice President
   Geupel DeMars, Inc.

2. Donald E. Parker
   Director, Value Management
   GSA, Public Buildings Service

3. Michael N. Zabych
   Value Engineering Officer
   U.S. Army Corps of Engineers

WINNER ANNOUNCEMENT
The winner will be notified in advance of the annual conference of the Society of American Value Engineers in the Spring, 1978. The winner will be invited to present the paper at the Society annual conference to be held May 10-13, 1978, at the Hyatt Regency Hotel, Indianapolis, Indiana.

AWARD PRESENTATION
The award will be presented by Richard B. DeMars, President of Geupel DeMars, Inc., 1919 N. Meridian Street, Indianapolis, Indiana 46202.
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