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PERFORMANCE
Official Magazine of the
AMERICAN SOCIETY FOR PERFORMANCE IMPROVEMENT
and
SOCIETY OF AMERICAN VALUE ENGINEERS
and
NATIONAL ASSOCIATION OF SUGGESTION SYSTEMS
and
NATIONAL PROPERTY MANAGEMENT ASSOCIATION

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Contributions in the form of articles, photos, letters to the editor, etc., are welcome. Editorial policy dictates the right to edit or reject any material submitted for publication. Views and comments of contributors do not necessarily constitute the endorsement or opinion of the American Society For Performance Improvement, the Society of American Value Engineers, the National Association of Suggestion Systems, nor that of the National Property Management Association.

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ECONOMY... IN GOVERNMENT

The citizen's quest for increased services continues to grow, while the source of funds to meet those increased services — TAXES — has reached a level bordering on the exorbitant. The cost of government has grown to such an extent that these same citizens look with extreme displeasure on any attempt to increase revenue through the tax structure. Where can the funding to provide the needed resources to meet the increasing demands of our populace come from?

In an attempt to indicate one source of added revenue, Congressman Larry Winn, Jr. (R-Kan), sponsored the first National Conference on Economy in Government in Overland Park, Kansas, on April 5-6, 1973. Co-sponsored by Trans World Airlines (TWA) and the Society of American Value Engineers (SAVE), the conference was hosted by TWA at their Breech Training Academy.

Billions In Tax Savings

Congressman Winn is the chief Congressional proponent of improving the effectiveness of delivery of citizen services while reducing, or holding the line on expenses. He has predicted billions of dollars in tax savings through an "across-the-board" use of value analysis. His efforts on behalf of the federal government have met with some success over the past few years. He chaired this conference as a public service project because he is convinced of the applicability of the value analysis/engineering techniques to all facets of government expenditures; local, as well as Federal.

In his letter of invitation to the Governors and local officials, Congressman Winn said, "Increased taxes

Continued on page 24

Career Opportunities

VALUE ENGINEERS

Collins Radio Company has immediate openings for Value Engineers with opportunity for personal growth in a professional environment. Responsibilities include working as part of an engineering team to conduct value engineering studies. Under broad functional evaluation concepts, products are analyzed to determine alternative materials, parts and methods for accomplishing desired functions at lowest cost. ME or EE degree required, with five years' related experience.

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D. C. CHAPTER OF NPMA FORMING
Organizing efforts are going forward in the Washington, D.C.-Virginia area to form a chapter of the National Property Management Association. Frank E. Rees, property manager at IBM's new plant in Manassas, Virginia, is the spark to set afire the many industrial and government property managers working in the Capital's environment. Rees would be glad to hear from any interested individual or organization.

YEARGIN RECEIVES BUILD/AMERICA AWARD
Yeargin Construction Company of Greenville, South Carolina, recently received the national “Build/America” award of the Associated General Contractors of America for its “P-R-I-D-E in Workmanship” motivational program. Yeargin was cited by the AGC for its “meritorious handling of the continuing problem of worker motivation on-the-job.” Mr. Morris E. Nichols, right, Yeargin Vice President of Operations, receives the AGC award from George Blanda, the great Oakland Raider kicker and quarterback.

NEW NPMA CHAPTER
A new chapter of the National Property Management Association has been formed in the State of New Mexico. Officers elected (left to right) were: Dwight Clayton, V.P.; Hazel Bechtol, secretary; John Stein, treasurer; and James Altman, president. Property managers interested in joining the Chapter may contact Altman in the Electronics Division of Los Alamos Scientific Laboratories, or by calling (505) 667-5326.

DESIGN TO COST
In a thoughtful and provocative editorial on Page 474 of the May-June 1973 issue of Ordnance Magazine, the problems of design-to-cost are reviewed and it closes with the statement: “The key might well be a much better capability to predict and assess technology. It is a science and an art that we haven’t exploited as thoroughly as we should.”

NARF-ALAMEDA CRAFTSMAN AWARD
Lee R. Collier, (second from left) journeyman electrician at the Alameda Naval Air Rework Facility’s Aircraft Assembly Division, was named Craftsman of the Year for 1972. Mr. Collier was honored for the outstanding quality of his work at a recent Zero Defects Awards Luncheon, held at the Alameda Officers Club. (Left to right) are: N. H. Wittmayer, Airframes Division head; Collier; Rear Admiral D. K. Weitzenfeld, luncheon speaker; Captain J. M. Wolff, commanding officer NARF-Alameda.

LETTER TO THE EDITOR
Bendix Aerospace Systems Division, long a developer and manufacturer of x-ray inspection products and systems, is now investigating the use of these x-ray systems and techniques in other industries. Recognizing the important role professional organizations play in the forward planning for new products and markets, we would sincerely appreciate assistance in helping us formulate research and development programs. We are particularly interested in the following:

Are x-ray systems, applications and technology a part of your professional activities?
Are there specific needs and trends which you have determined?
Who in your organization might we contact to discuss this area?

R. M. Magee, Manager, X-Ray Technology
Bendix Aerospace Systems Division
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Please register me for the 4th NPMA SEMINAR, to be held at the Jack Tar Hotel in San Francisco, October 18 - 19, 1973.

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PERFORMANCE
This year, American business and industry will lose in excess of $7.5 billion – or equal to four times the profits of General Motors – because of alcoholism. This third major public health problem is the cause of one of our most staggering industrial losses and human waste in the history of our country.

Industry employs in excess of 4,000,000 alcoholics, who can be found on every level of employment. More frequent than not, the problem drinker is a longtime employee with skills, experience and management know-how. The great majority are between 35 and 50, a time when they should be most valuable to their employer.

The heavy monetary toll is due primarily to absenteeism, errors, accidents, inefficiency, lower production, loss of customers, terminations and replacements. There is no way of determining the loss caused by the “half men in business,” who never give their full capacity to their employers!

According to Merle A. Gulick, vice president, The Equitable Life Assurance Society, in a study of management’s view of career-earning factors in heavy drinkers versus moderate drinkers, at age 30, the total abstainer or light drinker, considered a standard risk, has an anticipated life span of 74 years. This means the individual reaches the age of full productivity, or sixty-five, and enjoys nine years of retirement benefits. At the same age (30) the heavy drinker or alcoholic drinker, a rated risk, has an anticipated life span of 63, falling two years short of full chronological productivity, and deprived of nine years of retirement benefits.

What are the chances of having a problem drinker in your business? According to the latest statistics, at least one out of every fourteen drinkers have a drinking problem. Studies point to five per cent of a normal work force as having a problem with alcohol.

WHAT APPROACHES CAN BE TAKEN?

Deny any problem exists or could exist. This is unrealistic, and under such circumstances, supervisors continue to hide problems, difficulties are encountered more frequently in an emergency situation, and tragic terminations are more common.

Fire anyone who has a drinking problem, or is found drinking on the job. This, too, is unrealistic and costly, plus running the risk of the replacement also being involved in the problem.

Have a company program: (a) admitting the possibility of a problem; (b) training supervisory staff in the techniques of problem detection and employee handling, safety aspects of alcohol, facts concerning alcoholism and referral sources; (c) have adequate referral services.

The latter is the only real answer and approach, developing a closer knit supervisory group capable of detecting problems, promoting higher efficiency, lower absenteeism rate, and building a better esprit de corps, as well as offering employees an opportunity of seeking help, thus salvaging both industry’s investment as well as the employee’s own personal worth.

Knowing that problem drinking can exist is one thing; admitting it is a possibility in one’s business establishment is something else; but doing something constructive about it is what really counts, is it not?
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Los Angeles, CA 90009
JOHN DUFFY has been responsible since 1962 for the Value Engineering Program in various divisions of General Precision, Incorporated, now a part of the Singer Company. He is presently manager of Value Engineering in the Kearfott Division. He developed a value training staff which was utilized in corporate-wide seminar workshops. His special interest is creativity and he has conducted many courses in the Synectics method developed by Synectics, Incorporated of Cambridge, Massachusetts.

He has lectured extensively on the subjects of value engineering and creativity before SAVE local, regional and national audiences, and also at universities and other technical societies.

Prior to joining the engineering fraternity as a mechanical designer in 1944, Mr. Duffy was an instructor in Physics and Mechanical Drawing at Fordham University. He also held an assistant professorship in English and Comparative Literature at the same institution.

He has a Master of Arts degree from Columbia University and a Bachelor of Arts from Fordham University.

His affiliations include the American Ordnance Association, the Creative Education Foundation, and the Society of American Value Engineers.

CREATIVITY:

THE ESSENCE OF VALUE ENGINEERING

By John C. Duffy
Seventy years ago a well-known French psychologist, Theodore Ribot, in a book entitled "An Essay on the Creative Imagination" complained of the lack of attention to this important human faculty. He said, "The study of the creative or constructive imagination...has been almost entirely neglected... A few articles, a few brief, scarce monographs make up the sum of the past twenty-five years work on the subject."

Fifty years later, Professor Jay P. Guilford, Head of the Department of Psychology, University of Southern California, in his inaugural address as president of the American Psychological Association, made the same complaint. He said, "The neglect of this subject by psychologists is appalling... but the extent of the neglect I had not realized until recently. To obtain a more tangible idea of the situation, I examined the index of the Psychological Abstracts for each year since its origin. Of approximately 121,000 titles listed in the past twenty-three years, only 186 were indexed as having a definite bearing on the subject of creativity... In other words, less than two-tenths of one percent of the books and articles indexed in the Abstracts for approximately the past quarter century bear directly on this subject...."

A QUANTUM STEP

Such complaints could not be made today. During the past twenty years the number of publications on creativity has skyrocketed. Between 1950 and 1960, more books and articles appeared than in the previous one hundred years, and in the five years 1960 to 1965, the number was equal to the previous ten. This number again was reached between January 1965 and June 1966.

During the same period, almost every major University had been involved in some form of research on this subject. Beyond this, many large industrial concerns established educational programs to increase the creative output of their employees.

SERIOUS NEGLECT

But what role has the Value Engineering Community played in the development of this subject? Here, I have a complaint. In spite of the close relationship between value engineering and creativity, the subject of creativity has been seriously neglected by SAVE and other Value Engineering organizations. How did I arrive at this conclusion? First, from a survey of papers and articles published over the last twelve years in the proceedings of VE meetings and symposia. Of a total count of 435 papers only six or 1.4 per cent, are devoted exclusively to creativity. Furthermore, with one exception, none of these papers on creativity were presented by any of the outstanding authorities on the subject.

When we go to the textbooks and manuals on value engineering we find a curious contradiction. Although many definitions of value engineering include the word "creative," very little space is devoted to the subject. L. Miles in Value Analysis and Value Engineering, the first major textbook, defines VE, in part, as "an organized creative approach...." His treatment of creativity, however, takes up only three-and-a-half pages.

In a collection of articles by various authors published by the American Management Association in 1964, Carlos Fallon, who contributed the opening chapter entitled, The All Important Definition, omits any use of the word "creative" or its synonyms. He defines it, in part, as a "functionally oriented scientific method." (page 10). In a subsequent article entitled, Qualifications and Training, G. Rabstejnek states that the value engineer must be a creative individual, but in his remarks on training, no specific emphasis is placed on developing this faculty.

A CURIOUS PARADOX

Warren Ridge, in Value Analysis for Better Management, published in 1969, used the phrase "a systematic creative method" in his definition. Again, there is no discussion of creativity except for a reference to Alex Osborn's Applied Imagination. In his outline for a seminar, only sixty minutes of a total of forty hours are allocated to creativity. Furthermore, this lecture is to be given by a guest speaker, an implication that the resident value engineer is not qualified to handle the topic.

The definition in the DOD handbook 5010-8H on Value Engineering does not contain the word "creative" or any similar expression. In the chapter on Methodology, only two pages are devoted to creative problem-solving.

Why do we find this curious paradox? Why do we find what appears to be only "lip service" to an essential element of the process? In my opinion, the reason lies in a lack of understanding of the true relationship of value engineering and creativity. For example, L. Miles lists creativity as one of the twenty techniques of value engineering. In the workbook published by Value Programs for Industry, Incorporated, Roy Fountain's famous teaching group, "the creative approach" is listed as one of twenty-nine techniques.

MISUNDERSTOOD RELATIONSHIP

Thus, the general impression one gets from the experts in the theory of value engineering is that creativity is merely one of the many elements of the method. It is part of value engineering, not the essence. This, I maintain, is a misunderstanding of the true relationship and, incidentally, the source of much confusion as to the relationship of value engineering to other disciplines such as work simplification, industrial engineering and cost reduction. What then is the true relationship? I maintain that Value Engineering is the creative process. It is the creative process applied to a specific type of problem; namely, the function/cost ratio of engineering products. In other words, the phrase "value engineering," is just a more descriptive expression for a specific application of creativity thinking and creative behavior.

OBJECTIVES COMPARED

What is the basis of this statement? First, a comparison of the value job plan and the steps in the creative process indicates a similarity which is more than coincidental. A look at Figure 1 shows that similarity. Two examples of the creative process are shown. The one on the left, developed by Graham Wallas, is one of the early...
attempts to describe the process. The second pattern presented by Joseph Rossman, a U.S. patent examiner, was developed from answers to a questionnaire submitted to 710 inventors. Although he identifies more steps and makes no mention of incubation, the resemblance is quite clear. His first three steps are actually included in Wallace’s first step, preparation. Illumination and the birth of an idea are virtually identical in meaning, as are verification and experimentation.

Secondly, consider the objectives of the two processes. The objective of the creative process is something new and useful, a new work of art, a new machine, a new process. The objective of value engineering is to find new ways to improve the ratio of function to cost of engineering products. In each, the objective is to come up with something new and useful. If, therefore, the basic processes are the same and the objectives are the same, it is safe to conclude that we are really talking about one thing, and not two.

**CREATIVITY FUNDAMENTAL**

Assuming this to be true, what implications does it have for the value engineer manager?

The fundamental implication is that a major portion of his program should be aimed at raising the level of creative output in his company. To accomplish this, he cannot rely on occasional lectures by visiting specialists. To achieve more than a temporary interest, he must have a continuing program. He, himself, must become a specialist.

Obviously, the first step is to become familiar with the work that has been done in this field, especially over the past twenty years. This is not a simple task. I mentioned earlier that, since 1950, the amount of research and the resulting publications on this subject have skyrocketed. Consequently, even the selection of reading material is something of a task. First, there are only two books which attempt to cover the whole subject, and these are fast becoming outdated.

One was published in 1961 by John Haefele, a research chemist with Proctor and Gamble; the other in 1964 by Calvin Taylor, Professor of Psychology at the University of Utah.

**SOURCE OF INFORMATION**

It is also interesting to note that, prior to 1967, no one magazine or journal was devoted exclusively to creativity. Consequently, anyone who wished to publish an article or research report usually went to one of the many journals on psychology. For the layman who does not have access to a large library, this is a serious inconvenience. The advent of the Journal of Creative Behavior in 1967 was indeed a milestone. Published by the Creative Education Foundation four times a year, this journal is an excellent source of information on current developments in the field.

Another source of information is the annual three-day creative problem-solving session sponsored by the N.Y. State University at Buffalo and the Creative Education Foundation. Although these sessions concentrate on the technique of brainstorming, the associated lectures are usually given by prominent researchers in the field on other aspects of creativity. Also recommended for the Value Engineer who plans to intensify training in creative techniques is a week in Cambridge, Massachusetts, with the Synectics Groups, headed by George Prince.

**PROGRAM DESCRIBED**

These activities will do much for the value engineer in starting his education for creativity. But like every good engineer, he must keep abreast of the developments in his field. To do this, he must rely principally on the publications of active research programs. As an example of these programs, I would like to describe in some detail one program which has been in progress for over twenty years and which has profound implications not only for the teaching and practice of creativity, but also for an understanding of the nature of human intelligence. This is the program of Professor Jay P. Guilford, head of the Department of Psychology at the University of Southern California.

His work on creativity started in 1950 as part of a project on the attitudes of high-level personnel sponsored by the Office of Naval Research, as one phase of a broader investigation into the nature of intelligence. His interest lies in the intellectual aspects of creativity rather than in motivational and environmental factors. He rejected the prevailing doctrine that intelligence is a single, monolithic ability, and the view that creative talents are something outside the realm of intelligence. The studies began with the assumption that there are several, perhaps many, distinguishable abilities involved. It is also assumed that creative talents are not confined to a favored few individuals, but are probably widely distributed. During the exploration of other hypothesized intellectual abilities, a general theory of intelligence and its components, known as the “structure of the intellect,” was developed. Figure 2 shows the three-dimensional matrix of 120 primary intellectual factors which provides the basis for Guilford’s studies. The first major axis consists of the kinds of operations which the mind performs. There are five fundamental kinds of operations: cognition, memory, divergent thinking, convergent thinking and evaluation. The second axis contains the kind of content involved. Guilford identifies four types of content: figural, symbolic, semantic and behavioral. The third axis consists of six types of mental products: units, classes, relations, systems, transformations and implications. Each of the operations can be applied to each of the types of content and each of these twenty combinations can produce any one of the six products. Hence, 120 separate factors or mental abilities are theoretically possible. By the middle of 1970, ninety-eight of these factors had been isolated as primary abilities by the process known as factor analysis. An example of how elements of the three groups are combined is shown by the shaded cube. This represents a combination of the operation, cognition; the content, semantic; and the product, units: The cognition of semantic units; or, in more familiar terms, verbal comprehension.

**SIGNIFICANT FACTORS**

Early in the project, a separate task was initiated to determine which of these factors was most significant for creative thinking. As an initial hypothesis, they selected seven abilities: sensitivity to problems, fluency of thinking, flexibility of thinking, originality, analysis, synthesis and redefinition. The results of their investigation eliminated analysis and synthesis as primary abilities, thus reducing the
number of basic factors to five. These are shown in Figure 3. Their analysis confirmed that sensitivity to problems, or the awareness of defects or limitations of things, is a separate, primary ability. In terms of the matrix, this was originally identified as the evaluation of semantic implications (EM1), but subsequently changed to cognition of semantic implications (CM1). Tests for this factor consist of requiring the subject to list things wrong with objects, like the telephone; or with social institutions, like divorce laws.

The second trait which they substantiated was fluency in thinking or divergent production. This was shown in at least four separate abilities: word fluency (DSU), ideational fluency (DMU), associational fluency (DMR), and expressional fluency (DMS).

Continued on page 23
The purpose of this article is to determine how human performance and the managerial technique of Management by Objectives (MBO) are related. There are many successful MBO systems operating in organizations. However, as with any managerial technique or process, there are recorded failures. For example, MBO systems may be “paper exercises” or be utilized to “determine blame” when unanticipated consequences associated with technical and social processes occur in organizations. One must be cognizant of the distinction between the intent of a managerial technique and the results of the implementation process. This article will be concerned with the intent of MBO and how this relates to improving human performance. However, it is assumed that intent and implementation should produce the desired end results from use of the MBO technique.

DOES A RELATIONSHIP EXIST?

Clearly a positive relationship can exist between improved human performance and MBO. MBO is not a “cure-all” but, if properly implemented can stimulate improved human performance as the employee develops on his job. Expectations, ability and motivation, managerial style, feedback, positive reinforcement, and human need satisfaction are some aspects of MBO and all are related to human performance.

MANAGEMENT BY OBJECTIVES EXPLAINED

Management by Objectives is a technique designed to help the individual and the organization to grow. It is designed to accomplish two important objectives: (1) to elicit an optimum level of human performance and ultimately improve the effectiveness of the organization, and (2) to provide employees and managers an environment conducive to self-motivation, self-control, and self-

PERFORMANCE
development on the job. MBO is a process for getting from where one is to where one desires to be. It incorporates the needs of employees into organizational objectives, provides for joint determination of work goals to be achieved between employees and managers, establishes performance criteria to measure progress toward the attainment of these goals, increases meaningful and pertinent feedback to both the employee and manager in an objective manner, and provides an environment for individuals to grow on and off the job. MBO may be viewed as an alternative managerial control system accompanied with a planning strategy designed to help both the employee and organization grow.

The notion of MBO suggests one must decide where he desires to go (goals), accomplishments required to facilitate his getting there, and the supportive processes and resources necessary to assist the employee to attain desired outcomes. Desired outcomes in which jointly determined objectives and expected results may be developed can be classified into four areas: (1) daily job requirements, (2) corrective actions related to goal attainment, (3) innovative behavior, and (4) personal development.

These desired outcomes may be related to activities on and off the job. For example, extending education off the job may aid personal development and ultimately have on the job applications. The organization, via managers, provides challenges and support processes and resources for employees to merge personal goals with organizational objectives into a compatible "mix" so individual efforts and accomplishments are mutually beneficial.

These supportive processes include competent leadership — in terms of technical and interpersonal skills — physical and financial resources, and opportunities for increased responsibility, advancement, achievement, recognition, and influence of job content. It is unfortunate when a manager rigidly defines a job and then attempts to place a person into it. Rather, job content should revolve around the expertise of the individual and the manager should avoid taking a lazy posture in keeping jobs rigid. Many of these opportunities on the job give the employee the chance to experience psychological growth which is epitomized by learning and deeper understanding, and meaningful and challenging work in a stimulating environment where creativity, experimenting, and the development of new skills are encouraged. For example, the need to develop this type of environment for production-line workers is recognized by Richard C. Gerstenberg, who states:

"We must improve working conditions and take the boredom from routine jobs. We must increase the employee's satisfaction with his job, heighten pride of workmanship, and — as far as is feasible — involve the employee personally in decisions that relate directly to his job."

It is necessary to determine a means to get employees involved with their jobs and committed to their organization if improved human performance is an end we seek. No longer can we continue to view task accomplishment as the sole criteria to measure organizational effectiveness, but must also consider providing employees with opportunities to fulfill their personal goals and needs on the job.

HOW PERFORMANCE OPERATES

Performance involves the act of accomplishing desired goals. The level of performance (accomplishment) relates to the interface of managerial and employee expectations which are explicitly stated, mutually understood, and accepted. This means both parties should share in defining jobs — in terms of objectives, key responsibilities, and relationships — expected results, and measures of accomplishment to determine achievement level. In viewing performance, two operational elements are important: (1) effort, and (2) accomplishment. Effort is an ongoing activity which can be related to either or both employee goals and organizational objectives. Effort, if effectively directed and managed, should lead to higher levels of accomplishment; hence, higher performance levels. This means that performance can be improved without necessarily requiring additional human effort because present activity is redirected toward explicit, mutually determined ends.

The mere fact that expectations are jointly explored and related to organizational objectives is one step toward improving human performance. However, it should be recognized that employees may desire to satisfy some personal goals outside the organizational setting. The challenge to the practicing manager is to relate employee expectations to growth opportunities on the job. In other words, the manager should create situations with employee inputs so personal goals and organizational objectives are congruent. Chester I. Barnard in his book, The Functions of the Executive, stated:

"Strictly speaking, an organization purpose has directly no meaning for the individual. What has meaning for him is the organization's relation to him — what burdens it imposes; what benefits it confers."

Few, if any, employees will make performance contributions above minimum amounts tolerated by the organization unless they feel their rewards will exceed or at least equal their efforts. The employee evaluates sacrifices and reward opportunities in terms of alternatives on and off the job. These rewards may be either extrinsic or intrinsic. For example, providing opportunities for individuals to accept additional responsibility and to achieve a sense of pride in his work are illustrations of on-the-job intrinsic rewards. In this example, the organization provided the source of the reward but only the employee could apply the reward to his efforts and accomplishments. Extrinsic on-the-job rewards may take the form of promotion based upon merit, and salary increases related to work done on a differential and equitable basis in reference to other employees. In these examples, the organization is the source of the rewards and a manager applies them to his employees.

THE ABILITY - MOTIVATION RELATIONSHIP

Performance levels are influenced by both ability and motivation. If a performance discrepancy is perceived by the manager, it must be related either to ability (what the employee can do) and/or motivation (what the employee will do). Vroom expresses
this relationship as follows: \( \text{Performance} = f(\text{Ability} \times \text{Motivation}) \). Unless a mechanism is available to diagnose performance discrepancies and to encourage two-way communication, employees will be reluctant to seek their manager's help when problems arise. The employee needs his manager's help in terms of support, advice, guidance, counseling, and training. However, technical skill attainment can be identified if an MBO system is properly operating.

Motivation strongly influences the performance decision and usually is more difficult to deal with compared to providing employees with additional training for technical skill deficiencies. An employee needs to know specific duties and depends upon his manager for guidance in jointly determining objectives, key responsibilities, relationships, and performance measures. The employee has a need to participate in setting work goals and other decisions that impact him on the job and the manager should include him in this process. Employees also need to know how they are doing. Once performance measures and expected results are jointly determined, the employee can monitor his own performance. The evaluation process then becomes a joint venture and the employee has ownership because he knows what is expected of him. Lastly, the employee desires to be rewarded for meeting or exceeding performance targets.

A manager is not in a position to psychoanalyze why people behave as they do but he can focus on what causes employees to act as they do. The needs elaborated above influence the motivation of the employee to perform on the job. Through the MBO process, these needs can be satisfied and improved human performance can result. Robert F. Mager and Peter Pipe in *Analyzing Performance Problems* indicated that an important aspect of the interpersonal relationship between manager and employee fostered by MBO is that perceptions of whether performance matters, that non-performance may be rewarded, that desired performance is punishing, or that there are obstacles to performance, can be explored and, if they are accurate, the manager has the responsibility to change the environment. For example, if expending effort by "looking busy" is perceived as a rewarding activity by the employee, MBO provides the mechanism to change the events leading to the perceived situation.

### WORK PLANNING AND REVIEW PROCESS

Many appraisal systems utilized by organizations are designed to encourage performance through a "tell and sell approach," but unknowingly have the opposite effect. Rather than stimulate improved human performance, they discourage vital performance elements, such as innovative behavior and accomplishment, because no provisions are made to measure and reward these activities. For example, the superior-subordinate annual review of performance, utilizing subjective criteria such as initiative, appearance and ambition, does not make provisions for defining employee needs, job criteria related to organizational objectives, method or action steps to meet both individual and organizational goals, and accurate diagnosis of accomplishment. Rather, this process stresses effort and subjective judgments of effective performance known only to the manager. In fact, most managers view the annual appraisal of employee performance as an unpleasant task rather than an opportunity to help the employee develop and grow on the job.

We recognize the importance of feedback as a critical element of performance improvement. A major benefit of MBO is that the manager can spend less time controlling employees, because the employee is aware and committed to the standards jointly determined and can monitor his own performance, and more time in planning and innovative activities. Once the employee is involved in determining his work goals and the criteria to judge his progress, he will be more committed to his performance goals. Planning and reviewing performance is an intricate aspect of MBO and replaces the traditional appraisal approach. Periodically, the manager and the employee meet to discuss performance progress and to determine changes which may be desirable. The major difference with this process and the traditional approach is that the employee takes the active role and evaluates himself rather than only the manager. Rather than focusing upon ways the manager can change the employee, other dimensions of the work environment are considered. (Reference Glen H. Vamy, *Management By Objectives*.)

There are distinct steps the manager and employee engage in. Underlying these steps is the assumption that no two employees are exactly alike, in terms of ability and motivation, and must be treated as individuals on the job. The first step is for the manager and employee to decide where the employee is performing by viewing actual outcomes with expected results. This will indicate performance discrepancies which could be related either to the job, the expected results, and/or the man.

The second step is to diagnose and evaluate the reasons for the variations above or below the performance targets which were previously jointly determined. In determining explanations to why the performance is at a certain level, the manager must be extremely careful not to focus only on the man, as is the traditional approach, but also on the job and expected results.

The last step in the work planning and review process is for the employee and manager to jointly design plans, based upon the diagnosis and organizational constraints, to help the employee meet his personal goals and the objectives of the organization. These plans may involve redesigning the job, providing the employee with additional training or challenges, adjusting the expected results to reflect the dynamics of the environment and individual, and utilizing the managerial position to secure additional resources or more cooperation from another unit in the organization.

During this process, positive reinforcement can occur in terms of recognition and praise for a job well done, and creating new challenges to allow the employee to develop his capabiliti-
ties. The employee is now in a position to answer certain questions during this process which directly relate to his performance, such as: (a) How does my job fit into the organization and relate to organizational purpose? (b) How am I progressing on my job? (c) What opportunities are available for me to grow on the job? (d) Where am I going in terms of personal goal achievement?

The notion of MBO includes the clear definition of key responsibilities, managers and employees jointly establishing their goals, and timely performance planning and review sessions emphasizing the diagnostic aspects of accomplishment. Greater commitment to performance targets, primarily attributed to employee ownership as a result of the MBO process, should lead to improved employee performance in terms of human contributions as well as technical contributions. The latent potential of employee and managerial cooperative contributions is "unleashed."

Emphasis on extrinsic demands, such as more dollars for increased accomplishment, is replaced by greater emphasis upon the intrinsic aspects of the job as the employee sees his performance as being directly related to challenges and personal growth opportunities on the job. The shift from extrinsic to intrinsic emphasis will take time as we have "conditioned" employees to expect few opportunities on the job to allow them to experience personal development. In addition, extrinsic rewards must be at a minimum acceptable level before employees will be motivated toward growth on the job. Challenges and growth opportunities are not substitutes for material concerns and aspects such as good supervision, adequate working conditions, and security (getting the fairest break possible) must be adequately met before employees will respond to inducements designed to stimulate performance and involvement contributions on the job.

RELATIONSHIP OF REWARDS TO PERFORMANCE

MBO processes provide a mechanism to unite reward opportunities on and off the job with the personal goals of the employee. In the author's opinion, and behavioral research is supporting the view, only two categories of reward opportunities will yield the contribution of human performance beyond minimum expected levels. The MBO process provides the method to help the employee take advantage of these reward opportunities. The first category relates to opportunities for individuals to achieve based upon a person's internal standards. The second category is providing opportunities for individuals to receive formal recognition from those they respect based upon external standards.

Organizations, specifically managers, utilizing the MBO technique can provide opportunities in both these categories for employees. Certain employees may desire not to take advantage of a particular reward opportunity in one of the categories, but the important aspect to remember is that the opportunity should exist. For example, opportunities to achieve based upon internal standards are typified by responsibility in work, excellence in work, and feeling of fully utilizing one's skills. Opportunities to perform based upon external standards include levels of pay above subsistence, overt indications from others for an accomplishment well done, appreciation for accomplishments by co-workers and managers higher-up, fair, equitable performance reviews, and promotion based upon individual merit.

It is important to recognize that these rewards are based upon individual accomplishments and should be administered on an individual basis. It is not the company-paid insurance plans, across-the-board salary increases, additional paid holidays, and promotions based upon seniority that will yield employee commitment and improved human performance. The employee who perceives his manager is genuinely interested in his development will spend less time wondering how he is progressing and more time accomplishing personal and organizational goals.

CONCLUSION

Management by Objectives is related to improving human performance in a positive manner. The challenge to managers is to provide employees with reward opportunities and freedom to accomplish both personal and organizational goals.

MBO will require a great deal of time during the initial stages for the manager to "make it work." However, the short-run investment must be related to the long-run dividends in terms of improved human performance, increased employee satisfaction, and increased commitment to performance criteria and tasks. The supervisor must establish his credibility with subordinates, when utilizing the MBO process, by defining organizational and department goals, assisting the employee in defining their expectations as they relate to the job, and indicating specifically how employee expectations and goals are contributing to the effectiveness of the organization and helping the individual develop and grow on the job. Naturally, the reward opportunities must be communicated to employees and constant efforts made to relate rewards to accomplishments and assure equity.

A manager must work at MBO if it is to be viable and meaningful to those who are requested to function under this approach. The manager's responsibility will take many forms in addition to those already mentioned. For example, the manager will have to improve his listening skills, two-way communication skills, and the art of questioning. MBO will require some managers to change their style of leadership from a bureaucratic "I'll tell you how and when to do it," to a democratic style whereby the individual is given autonomy in determining how to accomplish tasks and manages himself. The manager must assume a supportive role and utilize his positional authority for the purpose it was designed; not to order employees to obtain results but to secure the resources necessary for his unit to function effectively. Therefore, MBO is not for every manager. If the manager cannot move away from a bureaucratic style of leadership, it is recommended that he not try to introduce or implement MBO in his organization.

There are problems associated with MBO and many traps and pitfalls to avoid. The key to successful use of the MBO technique is to take your time, be aware of these traps and pitfalls, to know yourself, and to recognize that there is a positive relationship between MBO and improved human performance.
It is with pleasure that I address members and guests of the American Productivity Improvement Conference.

Perhaps today, more than in any recent past, we are being challenged abroad. It is a friendly competition, whether we as a Nation will be able to meet the challenge. It is a friendly competition between our cities, cleaning up our environment, making the lives of the less fortunate while we continue to improve our productivity.

This will be the challenge of the future, and it is one that we must meet together.

That is why your organizations and your productivity improvement are so vital and the hope of our entire Nation, and I urge you to attend your 1973 Conference. For every step we take in the face of technological change and the new wave of growth that will come which we live today, it is important that we retain our productivity, a yet still vital, concept -- the willingness to improve.

Only through a revival of productivity and a productivity improvement, will we continue along the path of progress and I am confident that your organization will play a vital role in this great march.

Best wishes for a high productivity.
THE VICE PRESIDENT
WASHINGTON
April 23, 1973

I send my greetings to the American Society for Performance at your Fifth Annual National Convention, and I am glad to send my greetings to you. It is significant to note that at any other time in the country's history, the world of business has been engaged economically by forces that have determined the course of our nation but one which will determine the course of our future. It is significant to note that the need of our nation is to meet the needs of our environment and to provide for those who will face the future. It is significant to note that we must face it in the context of the 1970's, and we must face it.

Our organization's efforts to promote the national ethic of work are laudable efforts to a valuable to American industry and to the American people. I especially applaud the theme of hard work, in adjusting to the new realities of the competitive economic world in which we live. It is important that we revive a traditional, strong sense of work.

This is not the time for the soft touch, for a soft hand, for a soft touch. We must be strong. If this cherished ethic can we can carry this ethic to the future as a Nation, and I am sure that we will remain in the forefront of the world's economic development. We must face the challenge of our time, and we must face it with a strong sense of work.

Sincerely,

[Signature]
We have studied the nature of industrial property management; noted its complexity, along with organizational participation and impact; and have noted the typical methods used, and in use, to perform the task. These include:

1. No control or management (not discussed).
2. Decentralized departmental management.
3. Stand alones management of property by type — by organization.
4. Program Management Office (PMO) coordination efforts using 2 and 3 above (or some combination thereof) as the operating elements.
5. The centralized system which provides an authoritative organization to provide information and services to the entire company.

From this point of departure, it is provident to discuss a hybrid property system based on several advanced systems in vogue or in development today.

In order to put the organizational issue to bed, we believe that any interested, thinking top management will recognize the merits of the centralized approach to property management. Using this assumption, a relatively simple organizational structure can be developed to perform the property management task. A suggested version could be as depicted in Figure II.

Please note that the line of authority leading down to Property Management is absent. The reason is...
that, so long as it is not subervient to a property-using organization, it doesn’t really matter where it reports. In the real world, property reports to administration, accounting, comptroller, financial management, facilities (against our principles), materials, executive vice presidents, or to presidents, depending on the company one observes.

From a functional view, we are saying there should be “payroll loyalty” to property established by department people being assigned in the functional areas noted. Plant geography and company size will dictate numbers of people involved. The question as to whether these people perform all of the work or act as information sources is moot — it doesn’t matter. “Resident” department people perform the primary function of collection and dissemination of property information; furnishing technical guidance and audit services, and policy and decision making.

Information/surveillance flow lines depict the situation wherein the work involved cannot be performed by property people due to such things as union agreements or long-time company practice, and a coordinating effort will satisfy system requirements.

This organizational concept offers considerable flexibility. Depending on the many variables which get involved, one person can perform several functions, dashed lines can become solid and vice versa, physical locations (more than one site) can be accommodated, etc.

After organization, a fundamental tool mandatory to intelligent property management is a property manual. This document serves as the policy, definition and standardization guide for the entire system. There are several options available with respect to the manual. First, the source of authentication must be determined. A natural level to begin is with the property manager. If his “clout” is not considered great enough to draw a uniform response from other company departments, it is necessary that the authentication level be raised in the hierarchy until cooperation can be expected. Second, the manual may be issued as a part of the company procedures, or it may be issued as a separate document. Our analysis indicates the latter is most desirable for one basic reason: A separate property manual tends to reach the hands of people who need to use it. Property directions, in procedural publications containing other subjects, tend to “get lost” or become unavailable at some working levels. The third option is arrangement or format of the manual. Two conventional methods are by life-cycle category — acquisition through disposition — or by type — facilities, materials, etc. Either is acceptable, although the combination of both usually is necessary to cover some specialized sub-category or type.

The fourth option has to do with the method of developing manual content. Variations range from dictatorial edict by the property group to coordinated effort by all departments in the company. Mid-range is suggested as an acceptable compromise. The technical (contractual) aspects in which the property group specializes must be incorporated. But the using departments’ requirements should also be respected.

The final component of the property system is the data handling element. The options are manual, Automated Data Processing (ADP) and Electronic Data Processing (EDP). Under a centralized system, in a company of any size, EDP becomes the logical choice due to the sheer volume of data to be handled.

The starting point for the first man-machine interface can be a description sub-system. A basic requirement for the control system is that it supply clear, standardized and complete descriptions for each individually controlled property item. As a minimum, the description should include:

1. Standard noun nomenclature.
2. Manufacturer’s name.
3. Manufacturer’s model number.

From this base, other information can be added — almost infinitely — classification numbers, control numbers, codes, catalog numbers, federal classification, performance specifications, technical parameters, etc. The basic objective of the description system is to be able to assemble the inventory by like kinds of things in a catalog of some type.

Moving to the next step in the man-machine interface, we need to find a way to convey the description information to the machine. A typical property input data flow is shown in Figure III. Careful integration is required in four areas:

1. Custodial records;
2. Accountability records;
3. Control point data collection/processing; and
4. Conversion to machine language.

While keypunch is shown as the typical input, more sophisticated techniques such as direct entry may be used.

The machine output or machine-man interface is depicted in Figure IV. Here we find suggested reports available (or which should be available) from any comprehensive property system.

Reviewing what we have said, we find:

**PERFORMANCE**
1. Allegation to lack of property control in most companies today;
2. Description of “reasons” for lack of control — complexity and volume of data;
3. Some historical problems described; and,
4. A suggested approach to cope with problems and some desirable aspects of (a.) A Property Management organization; (b.) A Property Manual; and, (c.) A Property System.

The final question to be answered is “Why?” or “So What?”

There are many answers to these questions. Some of them are not yet known. Some of the known significant answers include:

1. We assume management wishes to discharge its obligations to the stockholders in the form of profit or company growth. If this is erroneous, forget the whole idea.
2. To create, optimize, or maximize profit and growth, management must be completely aware of all assets and use them to the nth degree.
3. A comprehensive property management system provides information concerning physical possessions to make the most intelligent management of them possible.
4. A major property management contribution to the company is in the area of investment. It is obvious that as utilization increases from 0, investment requirements decrease. For an increase in utilization from 25 per cent to 50 per cent, the investment requirement (shown as Line A on the chart) is cut in half. The property management program provides the visibility to implement a utilization effort for cost (B), which allows optimum reduction along (C).
5. Property management provided visibility also can reduce investment through another form of utilization called reallocation. Reallocation is defined as re-use of an item at some other location in the company after the original user no longer needs it. Figure 5 reflects this benefit if we change the names of the X axis to “Reallocation” and Line B to “Reallocation Effort.”
6. The property management system provides an ideal base for calibration-recall, preventive maintenance and other systems. As our schematic shows, the computer can be programmed to produce hard copy forms (reports) noting such things as work due, schedule, work done, and work past due on any item subject to calibration or maintenance.
7. The system also offers reduced costs through the “inventory by exception” technique. Succinctly, the system records various property transactions which require handling or sighting property items. If an item is moved, stored, maintained, calibrated or any similar activity performed, these transactions can be counted as inventory actions. “Bumping” these transactions against the master list yields the list of items yet to be counted. Some companies report up to 80 per cent reductions in costs to inventory using this method.
8. Maintenance cost records stored in the property system afford the basis for disposition decisions of high maintenance cost items which might otherwise go unrecognized.
9. Conversely, the same maintenance cost data can be utilized for forecasting required replacements in forward-year capital budgets.
10. Capital budget requirements for new items can readily be screened through the computer against existing assets to...
validate or negate the requirement.
11. In the realm of the unknown, there must be other techniques available to reduce costs of unnecessary ownership which, generally, equal acquisition cost in about three years time. The type of system we have described will certainly provide information for the development and execution of these new ideas.

In final summary, we have attempted to present an overview of property management, its historical problems, potential solutions and benefits to any company. There are a myriad of details and sub-systems hidden beneath the substance of this short paper. It would be our recommendation or suggestion that this particular management subject is worthy of inclusion in undergraduate and graduate-study curriculum. In addition to informing the student about this relatively new field, such action should have an influence on those managers who have not yet recognized the significance of such an approach to their endeavors.

CREATIVITY
Continued from page 13

The third basic trait was identified as flexibility. This again involved divergent production operations and was found in two separate abilities. It is characterized by an ability to produce a variety of different responses. For example, when listing uses of a brick, the person who mentions applications such as paperweight and lethal weapon, in addition to the various constructional applications, reveals his flexibility or ability to produce a variety of classes (DMR).

Originality is the fourth important trait. This is described as the ability to produce unusual responses to situations such as titles for stories or cartoons. In the language of the matrix, this ability is known as the divergent production of semantic transformations (DMT).

The fifth trait is the ability to change the normal meaning or function of something in order to develop a new meaning or function. A common problem is to provide a person with a package of simple items such as paper clips, pencils and rubber bands from which he is to make a useful mechanical device.

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I have presented this brief description of the work of Professor Guilford as a sample of the kind of knowledge every value engineer should possess if he is to be an effective force in raising the level of creative performance in his company. This is the area, however, where the prominent writers on the subject have done little. The subject is very broad; as a science it is in its infancy. Research programs are in progress all over the world and the volume of published information is overwhelming. We need an intensive formal program to review this data, filter it, and transmit the results to our value managers. If SAVE does not accept the task, it is up to the individual to do it on his own. If he accepts the proposition that value engineering is basically the creative process, he has no other choice.

THE STRETCHING OF RESEARCH AND DEVELOPMENT DOLLARS

To reduce costly U.S. development effort, attention is being paid by the Defense Department to promising tactical weapons developed in Western Europe. While still in office, former Secretary of Defense Melvin R. Laird stated, "The severe competition for national resources makes it virtually impossible for the U.S. to plan to retain technological superiority across the full spectrum of defense technology all by itself." This would mean the U.S. would depend on allies for some of its development needs. This dependence would not affect our economy because we would intend to produce any selected allied weapons here in the U.S.

HOW TO CONTROL GOVERNMENT SPENDING

Governor Reagan of California expressed the thought that government spending could be controlled more effectively by requiring every bill introducing a spending program to be accompanied by a bill spelling out how the cost for it would be obtained. The reaction of the public could be enough to stop approval of non-essential items and limit essential ones to what is really needed.
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Continued from page 13

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**UPDATE**

Continued from page 6

**NEW P.I. LOGO AT ATD**

Alan Engelhardt, quality engineer assigned as performance improvement coordinator and Evan Williams, senior engineering illustrator, both of Applied Technology, Division of Itek Corporation, have originated a new logo to aid in promoting Applied Technology's Performance Improvement Program. The new design shows "Mr. Pi" trying to improve his performance.

"In attempting to design a new logo," Al Engelhardt reported, "we wanted to lean heavily on the regular logo design, but add an identity touch. We believe we have accomplished this with Mr. Pi. We intend to show Mr. Pi in many different types of activities to aid in promoting Performance Improvement at Applied Technology."

A sample will be mailed to those interested in incorporating Mr. Pi into their program. Requests should be made to Alan Engelhardt, Quality Engineering, Applied Technology Division, 645 Almanor Avenue, Sunnyvale, California 94086.

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aren't the only answer to ever-increasing citizen demands for services. There is another and better way.” He spoke of the successful use of value analysis in the federal government, many major U.S. corporations, and some of the states, and stated that “the potential savings per state is in the multi-millions of dollars” and “similar savings potentials exist for large city and county units.”

**LEAP Program Successful**

During the conference, Mr. Barney Uhlig, Executive Assistant to the Governor of Minnesota, explained the Loaned Executives Action Program (LEAP) to the participants. This program was initiated when Governor Wendell R. Anderson, disturbed by criticism of the state government as “wasteful and hopelessly inefficient,” challenged the business communities of Minneapolis and St. Paul to show the state where and how to improve. Mr. Uhlig explained to the audience that “...the result was spectacular. Almost 100 volunteers from industry provided a total of 26 man-years of effort” in reviewing the different facets of state government, and “when implemented, their recommendations will save Minnesota more than $75 million per year.”

The Acting Commissioner of the Public Buildings Service (PBS) of the General Services Administration, Mr. Larry Roush, spoke of the tremendous strides being taken by PBS in utilizing the value engineering technique in all federal construction projects. The value program at PBS has been so successful that the Administrator of the General Services Administration (GSA), Mr. Arthur F. Sampson, has directed that the program be expanded to all of the other services of GSA. Mr. Roush’s comments included several specific examples of the types of savings which were made possible through application of value engineering in construction.

**Changing Image**

In his keynote speech, Congressman Larry Winn, Jr. stated that his research on the subject showed that “Value Engineering worked wonders when used properly, both in and out of the government,” but that the study also revealed that “...value engineering just wasn’t being applied to anywhere near the degree that it should be.” He complimented Mr. Dwight Ink and his staff of the Office of Management and Budget (OMB) for their genuine and inspired efforts to improve the management of the federal departments and agencies, and challenged OMB to ensure that the federal agencies utilize the value analysis technique. Congressman Winn further challenged the state and local officials attending the conference, who have a major responsibility in the spending of billions of tax dollars, to “change the image” that the taxpayers have of government officials, by utilizing the value engineering/analysis techniques within their own spheres of influence to preclude the imposition of additional or higher taxes.

**Revolution in Responsiveness**

Mr. Richard E. Wildman, Staff Vice President of Trans World Airlines, cited Congressman Winn as “Mr. Value in Government.” Mr. Wildman said that the Congressman had made a mark on the Nation, “...for in his quiet, but persistent way, Larry Winn has set the stage for a revolution in government responsiveness to its citizens.” TWA has used value analysis, with excellent results, in the review of systems and business practices. Savings have been measured in the millions of dollars over the past several years. Mr. Wildman stated that this same application to “software” systems could produce tremendous savings for state and local governments.

Additional presentations to the attendees gave concrete examples of major savings in the field of education. It was noted that a very high percentage of budget expenditures in government entities responsible for funding education was spent in the construction and maintenance of the schools, and was susceptible to large savings through the use of value engineering and other cost-oriented management tools. The construction cost of a large, modern high school in Fairfax County, Virginia, was reduced by $750,000 through the use of innovative building and design techniques, and the use of value engineering. Another example of value engineering applied to systems showed a vast improvement in the instructional program of a private (parochial) school in the Kansas City area, with attendant reduction in instructional costs and improvement in the relative “scores” of the students.

**Overt Action Required**

The search for greater economy in government has produced a method whereby those elected and appointed officials, who are truly interested in providing needed services for their citizenry without increasing the tax burden, can take overt action to reduce present costs and release otherwise encumbered funding to accomplish additional, needed functions. Value Engineering/Analysis is a proven management tool for accomplishing this job. The Society of American Value Engineers (SAVE) is offering their assistance to state, local and regional government entities who are interested in help in getting started in the move toward economy in government.

(The opinions and assertions contained herein are those of the author, and are not to be construed as official or reflecting the views of the Navy Department.)
Everybody knows why we offer cash awards to suggesters. The answer is simple. It's an incentive to get employees to participate. It motivates them to think and to act. Some companies pay as low as 5% of the savings while others award as much as 50%. How much is enough? Is the employee getting a fair share when he receives only 5% as his share for improving the financial position of his company? Is a company really trying to maximize profit if it gives away 50% of its savings on a suggestion? Would the company have received the same worthwhile suggestions by offering a lower percent of the savings?

Examination of the NASS Statistical Report shows a definite correlation between participation rates and the percent of savings awarded. A chart was developed by dividing the reporting agencies into three groups and plotting a curve from the averages of each group:

- Group 1 — Those paying less than 15%
- Group 2 — Those paying from 15% to 25%
- Group 3 — Those paying more than 25%

In order to minimize distortion, 12½% of the highest participation rates and 12½% of the lowest participation rates were deleted from the data. The three points plotted indicate a curve which indicates that higher participation rates accompany higher percents of savings; but the curve indicates a trend of diminishing returns.

Let's see what happens when we apply a couple of hypothetical cases. Let's assume we have two companies the same size. Company “A” and Company “B,” each having 1,000 employees. Assume Company “A” awards 10% of the savings and Company “B” awards 35%. Based on the chart, Company “A” will have about 150 suggestions per year while Company “B” will have about 300.

(Industry studies show the average administrative and investigating costs to be about $35.00 per suggestion; while about 25% will be approved; and the average savings per approval about $1,200.) Now, let's compare Companies “A” and “B”:

<table>
<thead>
<tr>
<th>Company “A”</th>
<th>Company “B”</th>
</tr>
</thead>
<tbody>
<tr>
<td>Savings</td>
<td>$44,400</td>
</tr>
<tr>
<td>Cost</td>
<td>$5,250</td>
</tr>
<tr>
<td>Awards</td>
<td>$4,440</td>
</tr>
<tr>
<td>Total</td>
<td>$ 9,690</td>
</tr>
<tr>
<td>Savings</td>
<td>1.4 to 1</td>
</tr>
<tr>
<td>Cost</td>
<td></td>
</tr>
</tbody>
</table>

In this example, Company “B” spent an additional $32,310 to save an additional $45,600. This is a “Savings versus Cost” ratio of only 1.4 to one, which is not a very attractive return if viewed by tough-minded management.

So, Mr. Suggestion Administrator, if you are thinking about approaching your management to increase the percent of savings, be careful. You may be in for a disappointment. They will probably want you to find a less expensive way to increase participation. Sure, they want more suggestions and more savings, but they also want a good return on any additional outlay of cash.

A little over two years ago I approached my management with a proposal designed to increase participation and savings. At that time we were paying 10% to all non-supervisory employees; supervisors were eligible to participate in the Suggestion Program but were not eligible for cash awards. The supervisors received recognition for their approved ideas in the form of Certificates of Commendation. I had noticed from my statistical records that supervisory participation was running about one-half of the non-supervisory rate, yet, the average supervisory approval was producing over five times the savings being realized from the average non-supervisory approval. I was sure my management would approve my proposal to pay supervisors 10%, just like

Continued on page 29
Designs for Participation Systems

Participative decision making systems currently represent the most advanced form of industrial communication. This evolution originates when management finds that the traditional form of one way communication downward is outmoded for their needs. The management then attempts to determine the employee’s attitudes, concerns and gripes through a variety of supervisory reports, surveys, and informal talks. It is hoped that by showing concern for the employees, they will become concerned about their work. Finding that this level of communication does not sufficiently fulfill their objectives management can proceed to the most advanced form of communications. In this form management assumes that the employee has something worthwhile to contribute and asks him to help in initiating and implementing change. The supervisor-subordinate relationship which results is the basis for participative management programs. There exists two main approaches for such programs, each being more appropriate with different levels within the organization.

The Leadership Approach

The leadership style for participative management involves a change in the normal method of supervision to permit and encourage employees to do more independent thinking and make more decisions for themselves. This involves sharing more information with subordinates and obtaining ideas from them. This approach stresses the interpersonal nature of face-to-face relationships and using general rather than close supervision.

This type of system uses the normal organization structure as a means to pass ideas upward. Ideas are to originate in discussion amongst the members (including the supervisory) of the immediate work group. The system assumes that the supervisory will represent the workers at the next higher participative group.

By the very nature of the


Ibid., p. 36.
structure, this approach is applied to the middle and upper levels of management. Participation in decision making under this style can very easily influence managerial policies and programs. Organizational goals can be modified in such a way that they fit the goals and needs of the members participating. Since most high level managers feel that the average worker has neither the business knowledge nor skill required to manipulate policies and goals this approach is limited to middle and upper managers.

The leadership approach attempts to motivate the participants by emphasizing the psychological satisfaction that can be obtained through participation. It opens opportunities to exercise upward influence and enjoy membership in a task force group. Such plans seldom stress any forms of economic rewards. The non-monetary compensation of this approach suits the middle and upper managers to whom it is applied. It would be nearly impossible to judge ideas submitted by managers and distinguish whether these ideas were done as part of the manager’s job or as something extra. Monetary rewards are much easier to give to employees, whose job it is to perform rather than think creatively, since these creative ideas are definitely something extra and not a part of their job.

Limitations of the Leadership Design

There exist many objections to the leadership style approach which limits its use and effectiveness. Since this system is based on interpersonal relationships, any barriers which might arise to block supervisory-subordinate communication can disrupt the program.

A system of this nature is usually initiated by upper level management, but can be applied to each level only with the consent and sincere participation of that level’s supervisor. The use of any style that is not the supervisor’s leadership form becomes easily recognized by subordinates. This is often interpreted as a lack of sincerity and causes the failure of the program.

There are many possible factors which can inhibit communications at all levels of management. First-line managers often dislike narrowing the foreman-worker gap because of fear of losing disciplinary controls. Most managers tend to lack accessibility. Subordinates require knowledge of both a time and place in which they can talk to their supervisory without fear of outside interruptions. Managers often lack the ability to both ask questions for additional information on unclear points, and summarize and keep straight the subordinate’s message. In a survey conducted at all levels of management in several companies in different industries, 72% of the managers felt that they did not have enough training to listen to employees correctly. This becomes insurmountable at lower levels of management since foremen tend to have even less education and experience with solving communication problems than middle managers do.

There are also many factors which inhibit the subordinate from freely relating their ideas to their supervisor. Workers tend to feel that disagreeing with their supervisors is unhealthy from the point of view that they might eliminate either some worker’s job or their own chance for promotion. Employees must be convinced that they are free to speak; it’s worth doing; new ideas are adopted; people with ideas get ahead; and conflict and criticism that sharpens the issue is encouraged.

The typical worker is less likely to desire to enlarge his job and is therefore, less responsive to freedom allowed in the leadership approach. In many fields of work the system can not be applied due to the massive standardization of assembly-line work. This in combination with the lack of communication training at lower managerial levels emphasizes the reasons that the leadership approach to negative feedback is successful only if applied to middle and upper levels of management.

The Formal Approach

The formal approach to participative management is a system which creates a second hierarchy of screening committees that runs parallel to management lines throughout the entire structure of the company. The committees are manned jointly by workers and management and serve to encourage, collect, evaluate, and pass on suggestions for improvements. In most plans of this type there

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1Id., p. 41.
3Richard Walton, op.cit., p. 27.
4Id., p. 38.
5Id., p. 39.
7A. Vogel, op. cit., p. 22.
8Richard Walton, op. cit., p. 38.
9Id.
is some definite scheme for dividing the results of improvements between workers and management. The procedure is designed to ensure that ideas are well investigated and forwarded to the appropriate level of management for implantation. The formal committee arrangement by the nature of its joint management-worker cooperation limits the use of this system to that of the workers and lower managerial levels. This structure does not facilitate the use of participative management between middle and higher managerial levels since this is accomplished in the normal business hierarchy.

The formal system allows individual decision concerning the quality and form of participation that is to be taken. The worker's activity can be limited to just submitting ideas or expanded to serving on the screening committees. The individual worker is also given more independence in the sense that he does not have to rely on his immediate supervisory to act on his suggestions. The worker can also be more critical of poor supervision when using a committee structure.

The formal plan stresses the economic gain which the worker can obtain by participating. In most systems these financial rewards are obtainable on both an individual basis for approved suggestions, and a group basis for increased productivity. This sharing of the benefits of the improvements satisfies the worker's sense of social-economic justice and makes the efforts of participation worthwhile.

One of the most important functions of the committees is the evaluation of suggestions and the determination of the amount to be awarded. Once the suggestion committee receives submitted ideas, it either evaluates the worth of the suggestion itself, or obtains the services of the company's specialists in the field most related to the idea. If the idea is approved and it promotes some tangible gain for the company the amount awarded is usually computed as a percentage of the first year's savings. The percentage generally ranges from ten to twenty percent and depends primarily on company policy. The total award must be within the maximum and minimum boundaries which have been previously set. When the award is presented it is best to provide the receiving with a statement thanking him for the suggestion and explaining how the amount awarded was obtained.

The determining of an award that is made for an intangible suggestion involves considerable more judgement on the part of the committee. One of the most commonly used methods is to assign points to various qualities of the idea with each point having a certain dollar value. Qualities which are often measured include effectiveness, seriousness, extent of application, cost, presentation, originality, duration of use, and employee welfare. Letters explaining how total amounts have been arrived at should be sent to the recipients.

If approval is not given to some submitted idea, the committee should make a great effort to explain exactly why his suggestion was not adopted and to encourage the worker to submit additional ideas. This effort can take the form of either a personal letter or even a short discussion with the suggester. Some plans also have an appeal process to avoid rejecting any project by an error. It is very important that the suggester feel satisfied in the amount of effort that went into investigating and evaluating the submitted idea. Failure to do such results in an impression of insincerity and the worker stops submitting ideas.

The formal plan provides a structure in which the failures in the communication of negative feedback between supervisory and subordinate can be avoided. This type of plan eliminates some of the difficulties which arise due to lack of human-relations training and behavior skills on the behalf of the lower level managers. Although the system allows the workers to submit ideas it often becomes necessary to vigorously promote campaigns aimed primarily at soliciting suggestions from the employees. This can be done in a wide variety of ways. Written materials including letters and memos, employee publications, and booklets explaining the suggestion system are considered to be most helpful. Creative posters and bulletin boards along with suggestion boxes and pictures of workers receiving their awards can also serve as constant reminders to the employee. Only by having a well publicized program can enough

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employee participation be generated to obtain the necessary numbers of suggestions to make such a system successful.42

The Success of Such Approaches

A properly designed suggestion system can become a useful way of generating additional profits through cost reduction. United Air Lines estimated its 1967 gross savings from suggestions at approximately $2,214,000.43

In a survey conducted by the National Association of Suggestion Systems, the 244 companies reporting showed that 42% of all eligible employees submitted ideas. Approximately 25% of these ideas were adopted. A total of $34,980,511 in awards was paid out with $48.32 the size of the average award.44

This represents somewhat over $150 million dollars in savings to business firms. This savings tends to indicate that employee participation in negative feedback through some modified formal plan can and does work successfully.

Summary

When negative feedback is appropriately implemented as a method of communications between the various levels of management it can be very successful in improving both the interpersonal relations between supervisors and subordinates, and the operating procedures of the organization. Participation in decision making greatly affects the motivation level of the employee. The expending of greater effort towards production by the employee through participative systems helps the employee satisfy his need for both achievement and group approval. The use of the leadership style, which involves face-to-face relationships, is best suited to middle and upper level managerial personnel, since this personnel is better trained in human relations. The formal plan eliminates most of the conflict that occurs when the leadership approach is applied at the lower company levels. This plan provides an alternate structure by which ideas for improvement can be submitted and appropriately rewarded. One of the best applications of this plan is the use of suggestion systems in many companies. Savings obtained, and good will won has indicated that negative feedback in participative management is well worthwhile and should be considered by many more firms.45

END OF SERIES

AWARDS . . . HOW MUCH IS ENOUGH?

Continued from page 25

we were paying the others; I had statistical data to support my proposal and had projected a conservative but attractive increase in savings.

Management's reaction was: "Yes, this looks like a good source for increased savings. We want additional participation from supervisors and the resultant increase in savings. But, we are paying out over a quarter of a million dollars each year in suggestion awards. We think this is enough, maybe too much. So, you can go ahead and pay supervisors, but come up with a new award structure. One that doesn't increase total award dollars."

After re-studying my data and projections, I made the following proposal which was approved by management:

1. Cut nonexempt employees' percent of award from 10% to 8%.
2. Cut non-supervisory exempt employees' percent of award from 10% to 5%.
3. Increase supervisory employees' percent of award from 0% to 5%.
4. Increase minimum award from $10 to $15.
5. Retain maximum award at $5,000.

After two years the results are pretty close to our projections. Supervisory participation increased from 16 to 27 per 100 eligible employees. Non-supervisory participation dropped more than we expected. However, part of this decrease can be attributed to a 55% drop in division employment during the past two years. The threat of impending layoff always has some adverse effect on employee participation. Also, during this time our house organ was discontinued, thereby reducing our promotional possibilities.

Most important was the fact that while the total award dollars paid was 15% less than would have been paid under the old system the savings per eligible employee increased 38%. In summary, we received more savings for fewer award dollars.

So, Mr. Suggestion Administrator, if you are getting pressure from tough-minded management to reduce the cost of your operation you can still have a successful program using a reduced scale of awards. You may have to work a little harder.47

PERFORMANCE
LARRY F. ROUSH was named acting commissioner of the U.S. General Services Administration's Public Buildings Service (PBS) and GSA Deputy Administrator for Special Projects in January 1973. He serves as one of the Administrator's top policy advisors. As deputy administrator, Roush performs special assignments for the administrator relating to all segments of the agency. As acting commissioner of PBS, he heads the largest branch of GSA in terms of manpower and appropriations.

Before January 1973, Roush was acting assistant administrator of GSA, charged with congressional and public affairs, priority projects, Business Service Centers, Federal Information Centers, and the Consumer Product Information Center.

Previously, Roush had been PBS assistant commissioner for Operating Programs, and had served as confidential assistant to the commissioner of PBS and to the commissioner of the Federal Supply Service, and acting executive director of FSS.

Before joining GSA in 1969, Roush served the Commonwealth of Pennsylvania as planning technician with the state planning board, administrative assistant to the director of the Bureau of Purchases, cost reduction specialist and executive assistant to the secretary of Administration and Budget in the governor's office.

Roush has been active in professional, civic and political affairs. He received a bachelor of science degree in business administration from Pennsylvania State University in 1961 and has completed one year of work towards a master of science degree in economic geography and industrial location.

These rather lifeless looking rings you see really mean a great deal to me; and, they should mean something to you. As a matter of fact, if you would look at them a little more closely, you just might see yourself pictured there as one member of today's design team.

LACK OF UNDERSTANDING

Do you realize that some members of the so-called building team don't seem to fully understand the end-use of the facilities they are helping to construct? And, they don't yet recognize their responsibility concerning cost, time and quality of construction; not to mention an insensitive reaction to expected early return on financial investment.

There is a near-fatal disease which too frequently causes members of the building team to act as individual stars instead of a coordinated group with a common cause to serve.

TEAM ACTION MISSING

Have you found a shoe that fits? Well, there are more.

Another affliction which demobilizes some team members is called the walk-aways. The primary symptom is for a team member to walk away from a project just after turn-key, thereby depriving the owner or user of an opportunity to discuss anything which might have gone wrong.

PERFORMANCE
The walk-aways and prima donnas sometimes combine and give members of the building team the shoulder-shrugs. This can be seen in those who have a constant desire to shrug their shoulders at a wide variety of problems.

Shoulder-shrugging is aimed at things like operation and maintenance problems, the worth of guarantees, warranties and claims for systems and components, deficiencies and omissions in completed buildings, and advising of problems arising from new regulations.

Let's face it: Shrugging shoulders, closing eyes and ears, and keeping quiet don't help to produce the best buildings. The lesson to be learned from some of these possible inadequacies is simply this: Without pulling in tandem — acting as a team — we don't get anywhere; least of all we don't get any good buildings built.

**IMPORTANCE OF COST**

Now, let's look at another pair of shoes. They bring to mind another very important problem area, and another question: Are you really cost conscious in your designs? I mean really cost conscious!

Money is a serious problem. We have been a nation of squanderers. The Diamond Jim philosophy has been allowed to run rampant for too long. We saw America as an endless horn-of-plenty — with a never-dwindling supply of resources, both natural and man-made. We have already begun to feel the environmental crisis which has resulted from this attitude. Now we are facing the money and energy problems. That cornucopia is NOT endless.

The President's 1974 budget proposed leaner expenditures, with strong efforts to safeguard against inflation. Frankly, our government must do as much, or more, with the same or less money. Plainly, we've got to get more bounce from the buck. Or, as the President has said, "We must exert at least as much — and sometimes even more — effort toward saving the taxpayers money as we do to spend it."

**JOINING THE TEAM**

The federal government is recruiting a team; a building team. And, it's not that tough to make the team, either. The three-fold qualifications consist of:

1) Concern for time, cost and quality;
2) Creative and justified use of innovation; and,
3) Confident and bold leadership committed to long-term.

These criteria are fair, and no prospective team member who is throwing his hat in the ring for a government project should have any problem with them. But, unfortunately, only a small percentage of those who want to make the team can really meet these criteria; most miss the mark.

What's the answer? Simply for team prospects to attempt the cure. Just take a dose or two — or three — of cooperativeness, and become intoxicated with team spirit. Then the full team can move on to the main goal of designing for value.

By design for value, we simply ask that you emphasize cost as one of your essential design parameters. And the tool which will best help you to do this is Value Engineering.

**VALUE EFFORTS EXPAND**

We at GSA are rather proud of our newest efforts. A philosophy of positive action and performance excellence has become a way of life in the Public Buildings Service and throughout the General Services Administration.

Our new way of doing business has spawned innovative procedures, methods, and programs such as construction management, project management, fire safety systems, performance specifications, systems building, two-step procurement and, of course, Value Engineering. We consider the value tool to be one of our major efforts in bringing about improvement and change.

As you may already be aware, Art Sampson has announced the implementation of Value Engineering programs in all the services of the General Services Administration. The efforts, already started in the Federal Supply Service, will get under way soon in the National Archives and Records Service, Automated Data and Telecommunications Service, and the Property Management and Disposal Service.

**COST A PRIME PARAMETER**

So, why are we in the value thing in such a big way? Because it works! In the relatively short time that we have used the tool in PBS, major cost savings and increased efficiency for the federal government have resulted. Savings in 1972 amounted to $1,694,000, which represented a return on investment of $3.84 for every dollar spent on the effort.

Being cost conscious is important, in the private sector as well as the government. The design firm of the near future will be one that offers Value Engineering services during the design process. That firm will be able to show that a well-designed building is a good investment — that a usable, complete facility, satisfactory to the client, is being provided at the most economical price.

And designing for value is part of the design necessity. It provides design performance in response to human needs. More importantly, the value concept is applicable to all areas of human endeavor.

**MANAGEMENT FOR VALUE**

Today we are in the era of the third revolution — the management revolution. And, management, within the structure of the building team, should learn to use this tool wherever it can be applied. Proper management decisions are necessary in the private sector as well as in government. Designing for value, whether it's in designing public buildings or developing a better way of life in America, is important.

"Let George do it." How often have we heard that? Well, the Georges of the world are a faceless breed. We need to give character to the elusive George. We need to become more cost conscious and less of a squanderer. Instead of ignoring important items, we need to face them.

We've got to join the buck-bouncing team and learn to score through effective use of the dollars we have.

With a few doses of cooperation and coordination we will learn to pull together instead of apart.

And, finally, through cost tools like Value Engineering, we will achieve our building-team goal of fine architecture within the budget.

Perhaps it is not so impossible a challenge to link apparently and stubbornly solid rings into a team of rings dedicated to designing for value.
The possibilities and advantages of value engineering in construction were dramatically illustrated by the recent experience of a large mid-western general hospital.

Approximately ten million dollars had been budgeted for the first stage of a major expansion program. Plans for the project had been developed over several years by traditional methods. Because of the complexity of the project and the desire to hold costs to a minimum, the St. Louis firm of McClure-Connors was retained by the owners to conduct a value analysis, in depth, for all mechanical and electrical sections of the plans and specifications, before these plans were to be released for construction bids.

Using standard value engineering techniques, the review team started by gathering information. Question and answer sessions were held with hospital administrators, designing architects and engineers, hospital consultants, and heads of nursing and maintenance staffs.

In the course of this questioning it soon became apparent that a number of functions were being provided that were not really desired by the hospital and that some necessary and desirable functions had been omitted or only partially provided. Analysis indicated that this was probably the result of difficulties in communication, over a several-year period, between the large number of people involved. Also, several persons active in the early stages of planning had died or transferred, and tentative decisions made by them had never been questioned or changed to meet new conditions.

Since it was obvious that major improvements in both usefulness of the building and costs were possible, the second stage of the VE review started.

The project was broken down into its basic mechanical and electrical systems. Each system was analyzed, its basic function identified, the need for the function debated, and different methods of performing the function...
considered. Outside specialists were retained by McClure-Connors to assist in this analysis as needed. Technical specialists in communications, waste disposal, materials handling, fire prevention and cleaning problems provided helpful advice. An experienced registered nurse was added to the VE team to insure that the desires of the hospital nursing and housekeeping staffs were given due consideration.

A study report was prepared for each of these systems. This study included a brief description of the preliminary data that had been gathered, an outline of the functions to be performed, suggestions for possible alternatives, and rough estimates of cost changes and improvements that might result. A review of these study reports with the designing architects and engineers was extremely productive, resulting in a steady flow of imaginative and creative thinking, fresh ideas, and improvements on old ideas from almost everyone connected with the project. A clearer understanding of the owner's needs and desires was obtained.

Based on the reaction to the study reports, the value team was able to concentrate on refining alternative ideas where it seemed most probable that improvements in quality, performance or worthwhile cost savings would result. The most promising alternatives were analyzed in greater detail for cost and effectiveness. It was determined that operating and maintenance costs over a six-year period should be included as part of the cost estimate.

Again, each basic system was detailed in a separate recommendations report. Each report contained a functional analysis, comments on problems involved, and a specific and detailed recommendation on the method that appeared to offer best value for the owner. Problems and recommended solutions were stated in non-technical terms and in dollar values to make them more readily understood by the owners, while detailed cost data and technical studies were submitted for verification by the designers.

Each report was reviewed by all concerned. Approved recommendations were turned over to the architects and engineers for implementation in the final building plans and specifications. The value engineers then prepared a final report for each system, listing additional functions, capabilities and facilities provided, and dollar savings achieved by using alternative methods to perform similar functions.

Actual documented savings were in excess of $1,500,000. In addition, an estimated $500,000 in savings, that were difficult to document with accuracy, were reported. Decisions made during the value analysis are estimated to produce $1,000,000 in future savings when Phase 2 of the expansion program starts, at some time in the future. Approximately a $400,000-value in improved utility and added functions were provided.

Total time involved during the value review and submittal of final recommendations was four-and-a-half months. Contract bids, when received, were under the budget by a substantial amount, and at the time of this writing, construction work on Phase 1 of the project is about complete.

The outstanding success of this value analysis effort can be attributed to:

- An involved and determined owner. Use of many skilled technicians with no responsibility for previous decisions and complete freedom to be imaginative and creative.
- Ability to build on the work of the original designers, and their cooperation and assistance in the review.
- Ample motivation for all parties.

An unplanned benefit from the review was a reduction of almost twenty percent in energy requirements needed to operate the building. In view of growing national concern about fuel shortages and an energy crisis, this is one more reason for the need for value engineering in construction.

It can also be assumed that the detailed review, together with a final proof-reading of plans by the value engineers, minimized the problem of costly change orders normally prevalent in hospital construction.

Value Analysis will be used more often in the future to effect lower cost, more functional buildings and facilities.

E. BRUCE CONNORS graduated from Washington University, St. Louis, Missouri, and is a Registered Professional Engineer in the State of Missouri. He has been president and chief executive officer of Connors Company, mechanical contractors in commercial, industrial and institutional projects for twenty-six years. Also, he was vice president of McClure-Connors Corporation, specialists in Value Engineering for the construction industry; president of Western Bowl, entertainment enterprises; vice-president and board member of Precision Packaging Company, container manufacturer; and vice-president and board member of O'Fallon Industrial Center.

Mr. Connors is a member of American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE), the Society of American Value Engineers (SAVE), the Missouri Society of Professional Engineers, and the Mechanical Contractors Association.

PERFORMANCE
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