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EDITORIAL POLICY: PERFORMANCE Magazine umbrellas those performance factors which improve the competitive advantage and excellence of American Consumer/Defense products and services for the markets of the world. PERFORMANCE is dedicated to the effective exchange of innovative technology and ideas as they relate to quality, reliability, safety, maintainability, cost reduction, value engineering, life cycle cost, management improvement, cost-to-produce, standardization, cost engineering, integrated logistics support, defect prevention, suggestion systems, motivation and productivity.

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 nor that of the National Association of Suggestion Systems.

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Creativity
In Action

We are happy to have this opportunity to greet the readers of PERFORMANCE magazine. You may have noted that, effective with the November-December issue, PERFORMANCE also became the official publication of the National Association of Suggestion Systems. We are pleased with the opportunity to join forces in this way with two other groups vitally concerned with improving “People” performance and productivity.

By way of introduction, let me quote the stated purposes of NASS, as outlined in our by-laws:

“The National Association of Suggestion Systems is a non-profit, service organization composed of members from Finance, Commerce, Industry and Government, dedicated to the worth, contributions, and benefits of employee Suggestion Systems. It will render, to all the members of the Association, services which cannot be accomplished by individual members or Companies, but only through the collective efforts of all concerned. The Association will support all methods of communication between employee and employer for the purpose of idea expression and exchange.”

NASS was organized in 1942 and has enjoyed steady growth throughout the years. Twenty-two chapters have been organized in major metropolitan areas throughout the United States and Canada.

In addition to our members from 17 other countries, seven member Associations from economically prominent countries have affiliated with NASS.

Suggestion programs have come a long way since the old stereotyped “Box-on-the-Wall”. (In fact many current systems discourage the traditional box by encouraging direct communication between suggestor and his supervisor.) Enlightened management has long since abandoned the philosophy that a suggestion is a negative reflection on supervision.

“It’s people who make the difference” is heard so often that it is becoming a platitude. A Suggestion System properly organized and promoted by management can and does put real meaning into these words.

It’s a paradox that we live in an era of creativity and change, while at the same time, because of specialization, we face the problem of job boredom, stagnation and decay. It’s a real challenge, but well worth the effort, to harness the creative power we all have and turn it into creative action: this is People Power and people want to be on the team.

Many organizations feel that the improved two-way communication resulting from a Suggestion System affords an adequate return for the time and effort involved. In addition to this, the over 200 organizations who shared their statistics with NASS for the year 1971 reported total awards paid to suggesters of $35,489,557. When you consider that the average award paid was on the basis of 16-2/3% or 1/6 of first-year savings, the total savings amounted to nearly 213 million dollars.

If your company is not actively involved in a Suggestion Program, or if you have a program and would like to learn how NASS can serve you, just fill out the coupon below and mail it to receive a free packet of information detailing NASS organization, objectives and services.
THE NEW PENTAGON IMPERATIVE

EDITORIAL COMMENT: The issuance of DOD Directive 5000.1 (July 1971) marked the beginning of what some are now calling a new era of defense procurement. The stage was set with these words, "This directive establishes policy for major defense system acquisition in military departments and defense agencies." The document bore the signature of David Packard, then Deputy Secretary of Defense and principal architect of the new concept. It set forth a spartan approach to the expenditure of defense dollars, stressing the need for "practical trade-offs between system capability, cost and schedule." The statement reflected Mr. Packard's strong personal conviction that cost consequences of design alternatives should be carefully weighed and that cost targets should be established "upstream" for design objectives. Skeptics were quick to dismiss the whole matter as Pentagon propaganda intended to impress Congress and the GAO, or at best a well intentioned but visionary approach to the complex business of systems acquisition. However, as time went by it became increasingly clear that the enunciated policy was gradually being translated into practice, unmistakably reflected in new procurements.

Virtually a year went by with no official pronouncements directed at the aerospace community. Then, in August 1972, the prestigious National Security Industry Association (NSIA) co-sponsored a Cost Symposium with the Armed Forces Management Association (AFMA). The meeting was held in an atmosphere of deep concern (and Congressional pressure) regarding spiraling costs of defense hardware and fixed budgets. Over the course of the two-day dialogue, captains of industry and defense establishment leaders stressed the need for dramatic changes in the procurement process. High on the list was the "new" imperative Design to Cost!

In recent months, the sobering remarks of NSIA/AFMA symposium speakers have begun to reverberate in all sectors of the military-industry complex. Questions are being raised — both in and outside of the Pentagon; can the techniques be applied to advanced prototype programs where typical research and feasibility are the prime objectives? Will design to cost create another cult and result in overkill? Are the accounting mechanisms needed to provide cost visibility readily available? Will innovation suffer in the interest of economy — with what consequences to military posture? Should the application be limited to high production hardware programs? Does Value Engineering play a part? These and many more questions are being asked. What about some answers? Some argue that they will come via implementation and experience. On the other hand, architects of the system and committed executives proclaim a sense of urgency and are willing to lay it on the line.

PERFORMANCE has tried to capture the essence of what officialdom has said to date on this vital subject. A summary of cogent observations is presented here. In following issues, PERFORMANCE will provide periodic update and invite reader participation. Hopefully this "open forum" will bring into sharper focus the presently obscure and elusive subtleties of this bold concept.

THE NEW PROCUREMENT WISDOM

Herbert Roback, Staff Director Committee on Government Operations, U.S. House of Representatives, March 28, 1972 statement:

"The point about personalizing the blame, I may add, is an exhibition of the cult of personality in reverse. If McNamara and Charles are to blame for what went wrong in the past, then a new hero is needed to put things right for the future.

"David Packard came to Washington in 1969, saw what a mess things were in, studied the situation, and wrote a memorandum. Judging by the attention it received, one is led to believe that this memorandum, written in May 1970, did as much for the history of defense procurement as President Nixon's subsequent visit to mainland China did for the history of the world.

"Mr. Packard stayed three years — long enough to change directions, but not long enough to measure results. What he has recommended makes sense but gives no assurance that the procurement world will be put aright.

"The unk unks are still there, even if the Government pays for them directly through cost-plus contracts rather than through get-well schemes in fixed-price contracts.

"Hardware prototypes are more reassuring than paper studies called contract definition, but the opportunities for prototyping are limited, given the money and time costs involved...."

"...The high costs of contemporary defense systems..."
invite greater emphasis on tradeoff analysis, design simplification, and greater reliability and ease of maintenance, but weapon technology does not stand still. Advances must be exploited. One man’s goldplating is another man’s need.”

NASI/AFMA COST SYMPOSIUM, AUG. 16-17, 1972

The Honorable Kenneth Rush, Deputy Secretary of Defense:

“...Living within a projected level budget in FY 73 dollars means weapons must be designed at a cost we can afford so we can own a sufficient number to maintain a modern force of adequate size to protect our national interests. My confirmation hearings made it clear that members of the Senate Armed Services Committee are not satisfied with the way we have been operating. For example, Senator Stennis expressed deep concern over the direction our design and procurement policies are taking us. One of Senator Stennis’ statements sticks in my mind. I would like to repeat it: ‘I think the weapons we actually need are in jeopardy, if there are not better methods used in buying them and getting them created and built.’

“In February 1972, Senator Stennis again expressed his concern, with the following words: ‘At these stratospheric price levels, there has been a tendency in the Pentagon to cut back on costly weapon orders – to reduce the numbers of planes to be bought – for example, when costs under a given contract begin to escalate. Our committee has suggested that this sort of backing and filling could leave us with forces inadequate to perform their assigned missions.’

“Senator Stennis’ concern is my concern and, as you know, it was Dave Packard’s concern too. He helped institute changes in DOD plans and procedures which the GAO now says have resulted in noticeable improvements…”

Dr. John S. Foster, Jr.,
Director,
Defense Research and Engineering

“Secretary Rush has put our systems acquisition dilemma to you bluntly and directly; it is urgent that you understand that the crunch is now. We can no longer continue to buy adequate quantities of needed weapons if the unit procurement and lifetime costs of those weapons continue to soar.

“...It is my plan to show you that there is a way out of the dilemma – a way to get both adequate quality and sufficient quantities of weapon systems at a cost we can afford.

“We are committed to that course. The policies have been established; you have read them in DOD Directive 5000.1 and in various speeches by senior Defense Department officials.

“Furthermore, you must understand and follow the policies – or they cannot succeed. And, if they do not succeed, then the dilemma that Secretary Rush outlined will force us again and again to choose between either buying a small quantity of very sophisticated weapon systems or allowing our forces to remain equipped with aging, obsolescent hardware. Neither of these alternatives is acceptable.

“The new policies have been summed up succinctly in a report by the Senate Armed Services Committee. I’ll read them:

1. Reducing concurrency
2. Designing to cost requirements
3. Using prototypes
4. Requiring hardware competition
5. Reducing radically the size of industry design teams
6. Minimizing the number of detailed weapon system requirements
7. Increasing independent OT&E prior to a procurement decision.”

“...Let me close by commenting on the role of the Congress with respect to our acquisition policies and practices. As you know, the Congress has been scrutinizing our actions in increasingly greater detail in recent years, both directly and through the use of the General Accounting Office. We welcome the opportunity this provides us to establish a better understanding in the Congress of the problems we face and the actions we are taking to improve our management.

“We do not believe it is feasible or appropriate for the Congress to attempt to manage defense programs through legislation. This is the responsibility of the Defense Department.

“At the same time, we fully recognize that the Congress should and does consider the effectiveness of our management of the acquisition process as a factor bearing on the authorization and funding of the programs we request. It is imperative, therefore, that we continue to improve the credibility of our management. It is up to us, to the Defense Department and the industry, to insure that the new policies continue to work – and to work even better.

“As we achieve our credibility with the Congress, as the Congress becomes satisfied with our performance as managers, as the Congress becomes convinced that we have brought cost growth under control, the Congress will be able to refocus its attention on broader matters of national security policy…”

A $112 Billion DOD Budget in 1980 is Identical to an $83 Billion Budget Now, Assuming No Force Level Changes.
Leonard Sullivan, Jr.,
Principal Deputy Director,
Defense Research Engineering

"...The big question is not how to design to a cost, but what cost to design to.

"This study focuses on the overall problem of what we can afford to buy rather than on the problem many of you are concerned with — what we'd like to buy...

"...As far as we can determine, the total estimated dollar increases between FY 73 and FY 1980 will be consumed by anticipated inflation. In other words, we believe a $112 Billion budget in 1980 will be identical in purchasing power to an $83 Billion budget now.

"I wish to repeat this statement because of the pressure we believe will exist on the DOD budget, we see very little opportunity for growth in purchasing power in this decade. Better times for DOD are not around the corner. More likely, our 'actuals' will be less than projected here if we are, as hoped, entering a generation of peace..."

The Honorable Barry J. Shillito,
Assistant Secretary of Defense,
Installations and Logistics

"...There is Congressional concern over rising unit costs. For example, the P-47, a World War II fighter, cost $100,000. The F-105 during the 1954 to 1963 period, cost about $2.5 million a copy. The F-15 is expected to cost about $10 million per copy. This cost trend is evident in other areas such as strategic bombers, aircraft carriers, and attack submarines. As Mr. Sullivan has said, if current unit cost growth rates are extrapolated for just 40 years, the entire Air Force budget would be spent on one plane; the Army budget on one tank, and the Navy budget on one ship. This trend, if continued, would cause Calvin Coolidge's question: 'Why not just buy one airplane and let the aviators take turns?' to become a reality...

"...It is my opinion that the (above) actions, plus the many efforts presently underway, i.e., value engineering, parametric cost estimating, standardization, reliability, support simplification, etc., can and will lead us in the right direction..."

George M. Low
Deputy Administrator, NASA

"...NASA is facing major cost problems. Let me put it more bluntly: If we don't do something about the high cost of doing business in space, and do it soon, our nation's space program is in deep trouble...

T. A. Wilson,
Chairman of the Board,
The Boeing Company

"The work of the past few years leading to more prototype procurement and the recent efforts to apply 'design to cost' principles to the development of complex systems offers opportunities for further improvement in the management of defense spending. However, I want to introduce a few notes of caution which I hope will be helpful in avoiding some of the mistakes we have made implementing cost improvement techniques in the past.

"Weapon system history is full of procurement and management fixes which have been designed to overcome cost problems of major significance. The usual sequence includes invention of a buzz phrase to describe the fix and then almost everyone climbs on the bandwagon.

"Costs can be a principal design parameter. I am sure that after a few frustrating experiences, 'design for cost' will become a valuable tool which we will learn to apply to the right developments and to manage with common sense. In a few years, we will see the beneficial effects in acquisition cost. However, it will be many more years before any effects are apparent in the two great users of money — manpower and operation and maintenance.

"In the late '40s and early '50s, airplane systems were procured under what today would probably be called a production prototype philosophy. Preliminary engineering
and tests were followed by a few X model prototypes, perhaps a service test quantity, and then limited production. Each year's funding was dependent upon satisfactory performance during the preceding phase. Although program acquisition costs usually exceeded initial estimates, it was primarily because of lack of precise early definition. The development program was deliberately left open-ended (using production funds) to provide flexibility to cope with changing threats and to take advantage of the availability of improved technology such as better engines or better avionics systems.

"This incremental development provided a sound basis for economical production of larger quantities or provided the government plenty of opportunity to cancel at minimum cost if insurmountable technical or funding problems arose. Although this period is often referred to as the 'good old days,' these days were not without major problems...problems which I believe were the genesis of many of the cost management solutions which have taken us so long to assimilate.

"...over-correcting for the operational deficiencies of the '50s caused many of the woes of the '60s..."

"The first problem was lack of weapon system appreciation. Flight development concentrated upon aerodynamics, propulsion and structure. Combat systems were added later so that performance penalties were often underestimated and delivery of a complete weapon system to the user was delayed. The impacts upon manpower, O&M and acquisition cost are obvious.

"The second major problem was inadequate reliability.

"The third major problem was lack of thorough and timely development of logistics support systems.

"All three of these problems were significant cost items. However, the cost aspects were overshadowed by operational capability and readiness impacts.

"Over-correcting for the operational deficiencies of the '50s caused many of the woes of the '60s...the 'ilities' staffs of government and industry were expended enormously. Tons of analyses were made prior to definition of specifications...before significant design and test data were available and these analyses were continued for years after the system reached operational maturity.

"Paper analyses also substituted for production prototype developmental processes. This was to be sure we understood all the threats and all the technical solutions and all the development, production and O&M problems. Since these analyses made us so smart, concurrency was invented to make up for the loss of time. When cost overrun became a national concern, total package procurement was invented to force the service and industry to consider the 'whole thing' and to inhibit contractor 'buy-in.'

"When this had less than desired effects, the accountants came in to solve all technical and management problems by having our work planned from contract award to program phase-out in exquisite work package detail and cost breakdowns to the tenth of a man.

"...'design to cost' overkill would create another cult...

"We must see that 'design to cost' does not head down this same path of overkill that would create another cult before evolving into what can be a powerful and useful management technique.

"There is already evidence to suggest this technique will be applied to advanced prototype programs where technical research and feasibility are the objectives. There may be segments of such advanced developments where application is proper but our past experience indicates that the advocates of new techniques will insist upon across-the-board, in-depth applications. This could be counter productive and defeat prototype objectives.

"I expect even more implementation problems will be encountered in production prototype programs where 'design to cost' parameters are certainly proper. The papers which have been written to describe how to work a 'design to cost' problem, usually cite an example which requires production of 1,000,000 articles at a rate of 500 per hour or something similar. Cost objectives are then broken down to the ball in each bearing. Obviously this could apply to some military procurements, but government and industry people involved in development of complex new systems must see that such parameters are applied at a level and at a time when the state of our knowledge of requirements and solutions enables intelligent and useful application...and we must insist upon a 'design to cost' system which is flexible enough to accommodate program changes as well as improvements in the 'design to cost' system itself as we get more experience using the techniques...."

INCREASING DEFENSE ELECTRONICS PRODUCTIVITY

Dr. John S. Foster, Jr., Director, Defense Research and Engineering, October 5, 1972 Statement:

"...We can and we must draw more heavily on commercial experience and move in their direction in design objectives, technical requirements, management perspectives, engineering design, data, and field support.

"Now, what can the Defense establishment do to move more in this direction? I believe that to acquire and maintain communications and electronics equipment in the future, in the quantities the Services need, three moves will take us to greater productivity:

1) Design-to-a-price
2) Greater standardization
3) Greater supplier responsibility for field reliability.

"To begin with, let me summarize the design-to-a-price concept.

"First, we will set a price-per-copy that is compatible with both the minimum required military performance and with what we can afford to pay for the number we need.

"Second, we will accept under that ceiling, only quality EVENTS
Military needs must be met or we will not buy the equipment. Products that are just cheap aren't acceptable.

"Third, we are willing to pay more in time and dollars in the R&D phase in order to assure achieving the desired unit production price and support costs.

"Fourth, we will be writing 'functional specifications' rather than detailed design specifications. In this way, the designers will be given the flexibility to find solutions leading to low cost and high field reliability.

"Fifth, we — and the contractors — will acquire enough experience, in the early phases to know that the desired product can be acquired for the established production price.

"Sixth, we will scrub the technical requirements and statement of work to reduce the number of military specifications and the Government data required.

"Let me emphasize that designing-to-a-price is not, as some people have asserted, a move back toward total package procurement. In fact, the two approaches are just about opposite.

"Total package procurement required one decision to develop and produce specified numbers of a system to specified performance, cost, and time limits. The new policies emphasize incremental acquisition and early flexibility in design specifications. We first build up experience through tradeoffs and feasibility work; then we award cost reimbursable development contracts — with incentives; and finally we have a competitive prototype ‘fly-off'; all prior to a production decision. At each step we minimize the risk to both the supplier and the Government and we establish confidence before moving ahead.

"The design-to-a-price practice is spreading and it’s working. One of the most exciting aspects of this concept is that the industrial engineers are truly stimulated by the added challenge. The design-to-a-price incentive drives them. They don’t stop when they have satisfied the performance requirements, instead they go on to invent elegantly simple, low cost and highly reliable new ways to do the job. They’ve tried it and they like it!! In addition, the Government Program Manager understands that the success or failure of his development program rests, to a significant degree, on the resulting acquisition costs and projected maintenance costs of his equipment. He knows that his system won’t be bought if he does not end up meeting the design-to-a-price goals.

"There are problems. One is the hard question, ‘what price?’ Thorough analysis, at the cost of time and money, must be completed prior to initiating new engineering development projects. In this way, we will have a viable design price which in our judgment will provide high performance, quality and numbers at a price we can afford; and, at a price we know can be met by competing contractors.

"Setting the ‘right price’ will take hard work, time and wise management judgment. Experience shows, however, that together we can arrive at practical and affordable values for the system performance we need. Remember that it is the existence of this price as an incentive to the industrial design engineer and the Government Program Manager, which is of primary concern...."


"...The general conclusions are: Systems, subsystems, and black boxes can be designed to a price just as readily as to a traditional performance specification. This is more easily achieved when the system concept and utilization is mature, e.g., much of our standard hardware, such as UHF/VHF communication, radio nav aids, self contained nav equipment, etc. In these mature fields, the tradeoff of cost versus various performance features can be relatively easily assessed. Admittedly, in the area of new systems concepts, the tradeoffs are obviously more uncertain, but definitely not impossible to at least bound within reasonable limits.

"In this connection, and this is a very important conclusion, if the procurement specification deals only with performance, the entire creativity of competing industry is motivated to win by offering better performance parameters. Price, which shall for the purposes of this report be defined as total life cycle cost, must be an important parameter of the specification to motivate industry’s creativity in this direction. It is our belief that if price is properly emphasized in the total procurement process: specification, statement of work, briefings, discussions, evaluation, weighting factors, etc., industry will respond by appropriately devoting its creativity to price.

"To achieve this, some training will be required both in industry and in the government. We do not see this so much as a detailed course in techniques, but rather a program aimed at establishing a frame of mind similar to the brainwashing sessions used at the beginning of most value engineering training programs. These should start in the government. Industry will follow by necessity. When the customer stops listening to how much better it will perform and insists on hearing how it can be made less expensive, industry will get the message. Some companies will do better than others, but this is true in the performance area as well.

"As to the mechanics of achieving the ‘Design to a Price’ goal, the following key points should be considered:

1) Specifications must become general guidelines to performance or indicate acceptable boundaries on performance rather than establish ‘best of all worlds’ standards.

2) The acquisition cycle must allow time during concept definition and development phases for thorough tradeoffs analysis. Provision must be made for the user agency as well as the procuring agency to be involved in these tradeoffs with the contractor. In our haste to meet requirements timetables, we invariably take more time in the long run to correct the mistakes and pay dearly for this, not only in the cost to correct the mistakes but in the price of the system,
because the system procured didn't have the benefit of proper tradeoff analysis. To provide this time, we may have to achieve better long term planning, but we must have the time.

3) Where possible, two or more contractors should be involved in the concept definition phase. This provides a competitive stimulus to creativity where it has the biggest payoff.

4) Preferably two contractors should be continued through development unless the particular system is so large and the number to be produced is so small that the cost of continuing competition through this phase is considered unwarranted. The obvious and extremely important advantage of continuing competition through this phase is that it permits final section for production to be made when the facts are really known thus reducing the skill required in proposal evaluation. This approach also eliminates or at least substantially reduces the motivation for contractors to buy-in the development phase because of the lack of assurance of winning the production follow-on. It also provides strong motivation during development to achieve the lowest possible production price.

5) Cost type contracts should be used to the maximum extent possible during the concept definition and development phases. Fixed price contracts motivate against good tradeoff analyses and the associated changes in program direction and emphasis.

6) It would be very beneficial if a means could be found to provide more coverage of a greater span of the acquisition process in the evaluation of funds utilization and the performance measurement of government program personnel, e.g., if the program manager is being measured only on the cost of the development phase, that is what he will minimize. Further, he has no easy way to draw on planned production funding to cover relatively small increases in cost of development which might result in much larger reductions in the cost of production.

7) Consider large profit incentives (20-25%) during the development phase with the incentive tied to the achievement of production price and life cycle cost factors stated in the specification. These incentives will be more than recovered during the production phase and would be very strong motivation to industry management.

8) Require projected production price to be reviewed periodically throughout the development phase just like MTBF and other key performance parameters...

Richard E. Biedenbender,
Special Assistant,
Office Secretary of Defense,
Installations & Logistics

"Areas to receive emphasis during the coming year include the following:

1. Greater concentration on the use of production unit cost as a basic design parameter during concept formulation and engineering development.

2. Better incentive to encourage elimination of marginal requirements in system development that contribute more to cost than to effectiveness.

3. Greater stress on the achievement of high reliability and maintainability and on demonstrating it in the test and evaluation phase.

Continued on page 15

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Summary of Basic Policies for Systems Acquisition by the Department of the Army by Honorable Robert L. Johnson, Assistant Secretary of the Army (R&D) at the Association of the United States Army, Fort Belvoir, Virginia, August 29, 1972.


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A SHIFT IN EMPLOYEE BENEFITS SEEN

Some Personnel Managers feel that younger workers are causing a shift in employee benefits that could affect job attitudes. The trend shows a greater interest in benefits that are immediately available than in those that are long deferred, such as pensions. Forecast for '73 is an increase in fringes such as survivors' benefits, health maintenance organizations, corporate self-insurance of health programs, and more interest in thrift plans whereby employers augment employees' savings on a matching basis.

AEROSPACE SAFETY DATA DIRECTORY

A directory of aerospace safety information sources will be released in '73 by the NASA Aerospace Safety Research and Data Institute. The directory will provide a consolidated and descriptive listing of services, holdings and costs of information resources of aerospace and aviation design, test and operation that can furnish information of value in hazard and failure cause identification, accident analysis, materials characteristics and other related areas.

CONGRESSMAN BROOMFIELD TO PUSH VE

"Too many Congressmen have never had to meet a payroll. Too many members of Congress are too far removed from the real problems of life," criticized Michigan Congressman William Broomfield at a recent Detroit Chapter-sponsored SAVE North Central Regional Conference. As a result of his exposure to value analysis, Congressman Broomfield intends to further the application of this discipline to the services and operations of government.

SUPERVISORS – THINK COST REDUCTION

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Continued on page 42
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“Let’s take one of these specialties — Value Engineering — and examine its future in the light of current defense cost policy. If a layman on the street examined VE in the light of current cost concern, he would think that VE should be enjoying unprecedented popularity. We all know that is not always the case — while many of the past criticisms have been corrected — the ‘after-taste’ lingers on in many quarters. However, the OSD is continuing to support Value Engineering. A number of actions have been completed to reform and revitalize the program. ASPR provisions are being simplified and improved.

“Today, direction and guidance from the DOD regarding design to cost has been both general and informal. It can be expected that specific procedural guidance will be available in the near future. For example, we are informed by John J. Riordan, Director of Production and Production Engineering, OSD, I&L, that a handbook is in the final phase of preparation and targeted for publication early this year.”

—PERFORMANCE—

**VALUE ENGINEERING: A SYSTEMATIC APPROACH,**

Arthur E. Mudge

McGraw-Hill Book Co., Inc.

286 pages, illus., $12.75

This easily read text is a competently done work on the subject of Value Engineering where the author provides the reader with the necessary foundation material to implement the proposed techniques.

The material is organized into three parts: Part 1 is devoted to the Fundamentals and Theory of Value Engineering. The author describes a new and unique addition to the Job Plan by adding the General and Function Phases to the traditional Information, Creative, Evaluation, Reporting, and Follow-up Phases. The General Phase is a very timely addition since it deals with the problems of human nature encountered during any VE application. The Function Phase is introduced following the Information Phase and elevates function from its rather obscure traditional location — buried in the information phase — placing it in the spotlight where it can get the attention commensurate with its importance.

Parts 2 and 3 are devoted to actual problem solutions resulting from application of the VE systematic approach. First the reasoning behind project selection is discussed, then Part 2, Value Engineering Job Plan Application, carries the reader step by step through the job plan application to an actual engineering problem. The purpose of this section is to help the uninitiated see his way through the concepts and the necessity of the reglementation presented in Part 1. Reading the application section will be a must for the uninitiated. This is followed by the 25 Case Studies presented in Part 3. These thumbnail sketches quickly show the variety of places, people and entities that can be involved in a broad scope engineering application of Value Engineering.

Included with the Table of Contents is a handy Reader’s Guide, predicated on a need-to-know basis. Five types of readers are identified ranging from “Executive” to “Student”, and three depths of study are specified. For example, for the “Value Specialist” it would be necessary to “study thoroughly” 10% of the material and “read lightly” the remainder. Also, the book is prolific with quotes and quips poignantly placed to emphasize key points. Consider the quip, “It’s what you learn after you know it all that really counts,” located near the beginning of Chapter 6 — “Information Phase”. This short quip crisply sums up the necessity for the five more phases, to follow, of the job plan.

This book is of value to the skilled Value Engineer, executive and novice. For the skilled Value Engineer, this text can replace his corporate VE manual or, better yet, save him the time of writing one. The executive can absorb the key concepts with a minimum of effort by following the Reader’s Guide. The novice will find the text informative, instructive and a valuable reference.
Why bother with new ideas in employee relations? People, you can say with some truth, are still the same; that is, their basic characteristics haven't changed. So, as managers, why not continue using the carrot and stick approach to employee relations? If this approach works so that you have no problems meeting your legal requirements and moral obligations as producers of life-saving drugs, you may not be interested. But many firms do have problems meeting these requirements consistently. And there is a general impression among consultants to the drug industry that it is easier to solve problems involving buildings, equipment and manufacturing procedures than those involving people. This is implied by Murphy's Law, "If anything can go wrong — it will," and it is also expressed in the reference to people as "The Indispensable Ingredient."

I think we can agree that managers vary in their skill in dealing with their employees. Some intuitively relate to people better than others. And certain basic assumptions about people by individual managers can help or hinder their ability to get things done through people. Suppose we would ask a representative group of individual managers of drug firms, "What are the fundamental, unexceptionable truths of human behavior?" The answers would include generalizations like these:

- People are products of their environment
- People want security
- All people want is bread and butter
- People are fundamentally lazy
- People are fundamentally selfish
- People only do what they have to do
- People are creatures of habit
- People are products of their heredity

Some of these answers are contradictory, but the basic assumptions held by managers influence their attitude toward their employees and thus help create the psychic environment or climate in which people work.

**Psychic Climate**

It is my contention first, that the psychic climate may make the crucial difference in the performance of your employees; second, that the Good Manufacturing Practices regulations provide guidelines not only about the physical environment but about the psychic environment; and third, that to secure the best performance climate, new ideas in employee relations should be tested and adopted.

How can one determine the psychic climate in an organization? Certainly something as qualitative as that is difficult to describe and measure.

**Drug Recall Case Studies**

Does management show trust and confidence in employees? An example of an instance where the management
apparently did not show confidence in employees resulted in a costly error. This was a coding mix-up which occurred when an automatic tube stamping machine failed to advance the digit of the code on a blood collecting-dispensing bag and donor set. The operator detected the error and discarded the piece of tubing wrongly coded. She then manually advanced the machine to show the next number. She did not see a piece of tubing hidden behind the machine. As the final product had ten sections, each section carrying the same code number, the following tubes were all erroneously coded. The significance of this incident is that the employee had been told never to make manual adjustments, but rather to call engineering or quality control personnel in the case of a malfunction.

How easy is it to bring problems to the attention of higher-ups? There are many examples of situations where employees assume they know what management wants but do not ask. In some instances this is suggestive of the fact that management does not encourage problems being brought to their attention. For example, our inspectors noted that quality control records on potency checks were consistently below 100 percent yet above the minimum 90 percent for substances under U.S.P. standards. Further checking and analysis revealed that the control chemists were responding more to what they suspected would satisfy management than what was actually in the samples brought to them from the line.

How frequently have you, as managers, asked employees for their ideas on how a specific operation with which they are familiar could be improved? If you have not tapped this resource, you may have lost an opportunity for cost savings, as well as for prevention of defects. For example, there was a recall of a firm's nose drops due to short volume. The filling of these bottles was by automatic filling machine with a control chart used to get the correct adjustment of the machine. Investigation of the short volume revealed that the employee who had filled this machine did not know how to interpret the chart and was unfamiliar with the machine. Another employee had suggested that instead of using a chart they check volume by using a graduate cylinder with a clearly defined volume mark. They did not adopt this suggestion. The net result a recall.

We could go on to illustrate all of these points in this performance improvement climate profile self-quiz. However, you may be interested in the average score of the 61 persons at the seminar who completed this quiz. These individuals represented managers in a variety of different industries. The characterization of the managers whose profile was below the average would be bureaucratic or dictatorial, whereas those managers on the right side of the average profile line would be characterized as collaborative managers.

You may be surprised at the second contention, namely that FDA's GMP regulations provide some guidelines about the psychic environment in a drug plant. I assure you I do not mean psychic in the sense that Jeanne Dixon does. Rather, it is in a sense that some of the things called for in these regulations do create a certain climate in which people operate. The section on personnel contains requirements relating to both supervisory and non-supervisory personnel. The reference to supervisory personnel states that there shall be an adequate number of supervisory personnel responsible for directing the manufacture and control of drugs. Also that their education, training, and experience shall be adequate in terms of assuring the safety, identity, strength, quality, and purity of drugs.

How do these requirements impact or create a climate among the people in the plant? Well, too frequently our inspectors have found, particularly in small drug firms, where one qualified person tries to carry out responsibilities that would tax two or three qualified individuals, when an individual in a supervisory position is harried by tremendous pressures, not only is his own health at stake but usually this pressure is translated into a very harried and tension-charged work climate. The individuals working with such a supervisor may reflect the same nervousness and may not take the time to do the checking and double checking called for by the manufacturing sections of the regulation.

ADEQUACY OF EDUCATION

The adequacy of education, training, and experience of key personnel also affects the psychic climate in a plant. There appears to be a correlation between a supervisor's education and experience and the ease of communication with his employees. A supervisor who feels inadequate as to his education and training will frequently generate a defensive attitude which tends to block communications. Such individuals frequently do not wish to receive suggestions; do not
wish to discuss goals and targets for their work with their employees. Furthermore, such individuals may feel that training of employees under them may challenge their authority.

The regulations also speak of the capabilities of all employees and indicate that these capabilities should be commensurate with their assigned functions. In order to be commensurate with their assigned functions, it specifies that they should have thorough understanding of the operations they perform, including the reasons for doing certain operations. There are a number of aspects of these requirements which have a very important impact upon the psychic climate in the plant. For example, we find with regard to the assignment of functions, that in a few cases of recalls, crucial tasks and responsibilities were not assigned to a specific person. This is not a matter of the workers' sense of responsibility. It is more likely a situation where management has not thought about making some important tasks an explicit part of someone's job. Sometimes the situation may call for creating a new job.

One case of this kind occurred when an androgen-estrogen injectable sample was packaged with the insert for an androgen injectable. Nobody in the plant was assigned the job of issuing and checking inserts and labels. As a result, anyone could go into the insert area and pick them up. This is, of course, contrary to Section 133.10. The packager picked up the wrong insert and placed it in the package. It was not discovered until the product was already in the marketplace.

One aspect of the personnel requirements relates to the fact that all individuals should understand why they are performing their operations. This relates to the concept that the Good Manufacturing Practice regulations involve not only the management but all individuals. Thus, we have tried in FDA's industry education program to make all personnel aware of their role in quality drug production. Just as management that is knowledgeable reflects confidence in its leadership, so knowledgeable employees radiate confidence. They know how their particular operations fit in with the goal of producing safe and effective drugs.

We have occasionally seen instances where individuals have been assigned functions for which they are clearly not capable due to physical or mental defects. For example, individuals who are assigned the job of reviewing labeling as it comes from the printer should have the requisite eyesight capability, as well as reading facility. We have found in some instances where individuals assigned this function did have eyesight problems. Individuals who are assigned functions beyond their capabilities have difficulties in performing adequately. These difficulties may generate a climate of uncertainty in the particular unit in which those individuals are employed.

One of the important aspects of the GMP Regulations is the need for checking individuals' operations, such as weighing by a second individual and the initialing or signing to the effect that the individual has checked the calculations of another. Occasionally this results in attitude problems. Some employees feel that when someone double checks operation, this suggests that they cannot be trusted. This attitude has to be overcome by the supervisor explaining the significance of the GMP regulations in terms of what is desired as the end product, namely, the assurance of a quality drug. Thus, the climate in which one must operate in a drug plant is one where checking or auditing is considered a normal function related to the product and not to the competency of the individual. This, as a matter of fact, is a rather unusual climate because there is a normal tendency for people to resent someone looking over their shoulder. From the above it is apparent that the GMPs do impact on the psychic climate in a drug firm. And the climate by and large in which people operate influences their performance. We in the FDA, as well as the public that buys your drugs, are concerned with the end products of performance. You, as managers, are concerned with performance improvement.

That is why it is up to you to secure the best work climate so that performance will be at maximum levels. In order to do so, one must consider the new outlook of employees today. And this new outlook is most marked among the young people; the people coming out of college, the young people who are just beginning in the labor market, and who approach this market with somewhat different ideas than we did a generation ago. We have heard for the past few years and lately with increasing hue and cry, the statement that workers, particularly young workers, do not give a damn anymore about pride in performance. In some cases this is a reaction to the fact that they are placed in a work climate in which we fail to recognize them as individuals, in which we fail to secure their involvement, and understanding of the goals that we, as managers, set. Obviously, when individuals with great expectations as our young people have, are brought into a stultifying work environment, their reactions are fairly predictable. Perhaps the question you, as managers, should ask is how to improve the work climate? Then when these individuals are brought into the operation of producing quality drugs, they will derive the satisfaction of being part of a team effort in a socially useful project. Let me suggest several new ideas in employee relations which have been used by small drug firms. They may make a difference in the performance improvement and the performance climate in your plant.

NEW IDEAS

What are some of the new ideas in employee relations that may improve the performance climate in your company? First and foremost is a well designed introduction or orientation for new employees. Some firms consider this a luxury, a taking-away of time from production. But the employee's first reaction to a company and his later attitude will depend in large measure on this first introduction. Certainly in a drug firm there is a lot that needs to be told to new employees, not only about the firm's products and firm's goals, but also the importance of these drugs to the nation and the fact that there are government regulations governing the production of drugs. Perhaps it may seem as though such an introduction should be limited to employees of a certain level. However, experience in a number of drug firms where they do have organized orientation programs
suggests that every employee, no matter what his job, should attend an orientation session when he first starts out. The manner in which this orientation is conducted will vary with each firm. In some instances, problems occur when a single employee is employed at a particular time and an orientation course is scheduled for a group of new employees several months hence. There are today techniques for introducing individuals to learning about any subject in an individual manner through the use of cassettes and film strips which can not only give him information orally but also visually. These training devices can be used for such orientation purposes. They can also save time waiting for a group orientation. Of course, as a follow-up to this rather cold type of introduction, the supervisor should be prepared to answer questions to satisfy the individual's curiosity about a number of important aspects of plant operation.

Once employees have received the orientation that is so essential, the company should continue this process of orientation through seminars held on a monthly or bi-monthly basis involving employees at different levels. These seminars can be organized around the subject of GMPs. We have worked with several firms assisting them in putting on in-plant training seminars. As part of these seminars the film, "No Margin For Error," was shown to all employees.

In one plant of a small firm it was the first time that all employees were brought together for any sort of instruction. One of the things that the manager stressed following the movie was that he would like to see employees report situations which might lead to errors and report actual defects in products which may have escaped quality control inspection. I recall one employee asking the plant manager, "Do you really mean that you would be happy to have me tell you about a mistake that occurred in the product?" The manager stated, "Yes." The employee then responded, "But, if I did that, wouldn't you fire me?" The manager flushed for a moment and then his response was, "No, the point is that it would be to the benefit of my customers if we never shipped out that product or if we did, if we got it off the market quickly. The fact that someone made an error is something that I could forgive but I could not forgive if an individual knew of an error and did not let me know." These words of reassurance fell on skeptical minds because the concept was so new. The first time that you get this type of question, you too will do a little soul-searching. Yet only when you have convinced the employees that you really mean what you say, will they begin to trust you and you to trust them. This will be the beginning of the climate necessary for performance improvement and reduction of errors.

Another new idea in employee relations that has had some vogue in recent years is the concept of "Job Enrichment." This is a concept which has been promoted primarily by Professor Frederick Herzberg of Case-Western Reserve University. He has posted a theory of motivation, which indicates that when employees' jobs are seasoned with satisfiers such as recognition, a sense of achievement, and personal growth, that they will become far more productive and efficient. This theory is being tested in a number of manufacturing establishments and there is evidence that it certainly does help in some companies to overcome absenteeism, high turnover, and lagging worker productivity, and that it is a way to challenge workers, especially the restless younger ones. For example, there is the Comign Glass Works where individuals on the assembly line were given responsibility for checking on incoming parts to see that they conformed to specifications, in addition to their other duties. They did find instances where parts from other companies were rejected on their own inspection. While this, of course, slowed production, the Comign executives weren't angry because the company found that not only did this enrich the employees' jobs and improve their attitude, but in the end it resulted in greater productivity.

There are other companies that have tried job enrichment and found that it does help in some instances. However, they have found that the involvement in decision making which job enrichment may require is not the continuing motivator. Unless people make more money as they get greater responsibility, they have found that they will not continually respond to the job enrichment program.

There is one new idea in employee relations which goes to the supervisory personnel possibly more than to hourly employees. And that is the concept of continuing education as an essential process if technical personnel are not to find themselves obsolescent in terms of their job demands. The drug industry has not promoted formal continuing educational programs to the same degree as other industries. The reason, in part, may be due to the fact that in some countries most supervisors and managers of drug firms are pharmacists. Here in the United States only a small proportion of such officials are pharmacists. Some of our Colleges of Pharmacy have introduced the concept of continuing education in manufacturing pharmacy. This is certainly the type of program that should be supported by drug firms and by drug trade associations. Well informed individuals in supervisory jobs, whose training is continually updated, will provide that climate of understanding and confidence which will permeate the entire work force.

Your association has done a very laudable job in conducting a series of educational seminars which are mini-continuing educational programs. These should be supplemented by more formal training for longer periods of time. Your seminars should stimulate individuals in your industry to go ahead with plans for continuing education.

We have described some of the new ideas in employee relations which should be tried in your industry. Some of these programs are flexible enough to be used by small, medium, and large firms. The central aspect of all of these new ideas is the importance of the individual, his proper attitude, training, and continuing education. Perhaps by adopting such new ideas, many firms will find that Murphy's Law can be replaced by Bach's Law, which says, "If anything can go right — it must."

The important thing is to try these new ideas.

Motivation Theory: Toward an Eclectic Synthesis

By Lawrence L. Steinmetz, Ph. D.

One of the continuing problems of practicing managers is that of how to motivate employees. Employee motivation is not only a perennial problem, but it is one to which managers are more than willing to devote a great deal of time and money toward solving.

Because managers are willing to devote such time and funds, there of course has arisen a plethora of theories (mostly available for a fee from the theorist) as to what does motivate people at work.

This article has as its subject the same area of concern — employee motivation. However, rather than endeavor to come up with a new theory, it will attempt to logically develop two ideas: 1) support for the statement that there really hasn't been anything new come along about motivation theory; and 2) that most motivational theories merely rehash what has long ago been observed. Therefore, this paper is an effort to tie together in a neat little package — in the theoretician's terms, eclectically synthesize — the theories of motivation which have been with us for years and which will probably be rehashed and reissued in a multiplicity of ways over the next century or so.

In the Beginning

In 1954, Abraham Maslow published a book called "Motivation and Personality." While that was not the first book published on the subject of employee motivation or, for that matter, the motivation of people generally, it does serve as the root source of most motivational theories today.

Of course, if one wants to get into really old motivational theory, he can. For our purposes, however, it is necessary to stick with that which is considered recent by today's theorists. Most theorists today start with Maslow, and so shall we.

Maslow's Theory

Maslow's basic theory is that man is motivated by a hierarchy of basic needs. Thus, sound motivational theory, in re: Maslow, as exercised by the practicing manager, assumes that people are in a continuous motivational state. Presumably only the nature of their motivations change and fluctuate; ranging about this hierarchy. In short, according to Maslow's theory, man has a never ending sequence of needs which motivate him. Any one of these needs is higher or lower than any other need that he may have. The important point to recognize about Maslow's hierarchy at this point, for purposes of our exposition here, is that the basic needs are monetary in orientation and can be satisfied if one is paid, or already has a sufficient quantity of money and that social ego and self actualization needs are psychological in orientation and can only be satisfied with some form of psychic income.

The recognition of the importance between the basic drives being pecuniary and the higher needs being psychological is the key to interpreting all current motivational theory because it shows one of the two basic differentials in people's motivational outlooks. More to come on the second basic differential.

Figure 1 shows Maslow's hierarchy of needs. There it can be seen that man begins with his basic physiological needs and progresses up the ladder to his safety or security needs, finally getting to the plane of his social needs. Subsequently he goes on to be motivated by his ego drives and, ultimately, his drive for self fulfillment or self actualization. The important thing to recognize about the Maslovian hierarchy at this point, for purposes of our exposition here, is that the basic needs are monetary in orientation and can be satisfied if one is paid, or already has a sufficient quantity of money and that social ego and self actualization needs are psychological in orientation and can only be satisfied with some form of psychic income.

The recognition of the importance between the basic drives being pecuniary and the higher needs being psychological is the key to interpreting all current motivational theory because it shows one of the two basic differentials in people's motivational outlooks. More to come on the second basic differential.
Then Came Herzberg

The theory of a little more recent vintage than the Maslovian Hierarchy of Needs concept is the Motivation Hygiene Theory of Frederick Herzberg. Herzberg’s basic work was published in 1959. Herzberg’s work is decidedly similar in many ways to the work of Maslow, yet it is argued that it is significantly different in some ways. Let us see.

Maslow’s work postulates that man is motivated by a hierarchy of needs, in which one need must be satisfied before another is challenged and thus becomes a motivator. Herzberg, on the other hand, maintains that man has a variety of needs which can be concurrently pursued and which come in no predetermined order. Another way of putting this is that the Herzberg apostolate argue that an employee can, and does, seek such things as ego reward, self actualization, and physiological need satisfaction all at the same time, while the Maslow apostolate would say that an employee would seek self actualization only after his physiological, safety, social and ego needs have been satisfied, in that order.

Basically, Herzberg’s theory is founded on the results of a research study which was made in the Pittsburgh area. In this particular study, (limited to 200 engineers and accountants), the subjects were asked to recall experiences about their jobs which caused them to have emotions about the job. These recollections were recorded in terms of whether or not the subject was made to feel “good” or “bad” toward his job. These sources of “good” and “bad” feelings presumably were what really made the employee feel satisfied or dissatisfied toward his work, toward his job performance, his interpersonal relationships with co-workers, etc.

The results of the Herzberg study can best be shown in Figure 2. There it can be seen that the various factors mentioned by the respondents to Herzberg’s study are identified on a bar graph. The length of each bar shows the frequency which that particular factor was mentioned by the respondents, while the width of each bar indicates the duration (or what might be called the intensity of the feeling) held by the respondents toward each identified factor. Basically, five factors emerged from the Herzberg study as being sources of strong job satisfaction: achievement, recognition, doing the work itself, responsibility, and advancement. Concomitantly, a list of dissatisfying factors also emerged from the study. These dissatisfiers were identified as: company policy and administration, supervision, salary, interpersonal relations with one’s supervisors and working conditions.

The upshot of the whole Herzberg study is the fact that not only did he identify what factors at work cause strong sources of satisfaction or dissatisfaction, but that these satisfiers and dissatisfiers, for the most part, are undirectional in effect. That is, the factors of achievement are practically always mentioned by the respondents as positive feelings toward the job and tend not to serve as a source of dissatisfaction for them. By way of contrast the dissatisfying factors, company policy and administration, technical competency of supervision, salary and wages, interpersonal relations with one’s co-workers and supervisors, and working conditions, are basically unidirectional in a negative sense or sources of dissatisfaction.

Analysis of the satisfier/dissatisfier phenomenon by Herzberg serves to explain why the Herzberg theory is called the Motivation Hygiene Theory. Basically, the dissatisfying factors describe the environment in which work is done rather than the feeling associated with the actual performance of the work. For this reason, the dissatisfying features are called hygiene factors, indicating that most sources of negative feelings at work come as a result of the conditions under which the work is done. In contrast to the hygiene factors, of course, are the satisfiers or motivational factors. These all are associated with doing the job itself and are called motivational factors because they presumably elicit the strong, positive incentives which keep people happy and productive at work.

It is, of course, an oversimplification to say that the Herzberg analysis simply means that all one has to do to effectively motivate people at work is to provide an enriching work environment. However, the basic gist of the theory, as interpreted and used by Herzbergian disciples amounts to emphasizing the positive satisfiers, plus deemphasizing the negative (in an effort to keep employees from becoming grossly unhappy, the Herzbergian will argue that this can be done by minimizing inequities and imbalances which exist on the hygienic factor side.)

While it can be argued to some degree just how accurate the above interpretation of the Herzberg theory is, the accuracy of that, or any other interpretation of the Motivation Hygiene theory is academic at best. Of far greater importance is the recognition of the fact that the Motivation Hygiene Theory is simply another way of restating the Maslovian Hierarchy of Needs Theory. For example, Figure 3 represents the superimposition of Figure 1 on top of Figure 2. This can be quickly and easily done if one simply recognizes that the dissatisfying features found in the Herzberg Motivation Hygiene Theory are basically monetary in orientation with one exception — social drives. That is, supervision and interpersonal relationships are indicated, in the Herzberg schemata, as dissatisfying factors, and these relationships fit nicely into the Maslovian middle plateau of needs — the social needs. In contrast, on the right hand side (satisfying side) of the Motivation Hygiene Theory all the factors identified derive from the feelings experienced while actually pursuing one’s ego and self-fulfillment drives at work (i.e. trying to win recognition, develop a reputation, achieve, win a promotion, enjoying the work, seeing how good one can really do at the job, and experiencing the great feeling of having done a job well).
But There Are Others

Maslow and Herzberg thus are saying the same thing about what motivates people. But others have entered the fray for, unfortunately, when companies are willing to spend time and money developing ideas about what motivates their employees, there are an ample number of people willing to provide their services. Thus, in recent years we have seen emerge numerous other theories of motivation, some of quite recent vintage, and all claiming to supplement, reinforce and/or substantially add to "older" theories. Actually, all of these theories are too numerous to mention, but several of them do seem to be worth the effort at this point. Primarily they can be divided into two groups — those which are concerned with a very strong latent drive (sometimes termed intrinsic drive) which can be used to explain why some people have such surprisingly strong (and otherwise inexplicable) motivational drives and those concerning the physiological process to which all of mankind falls victim — aging.

Strong Latent Drive Theories

Over the past few decades two men have emerged who have advanced theories of motivation concerning people at work which do contribute quite a lot to the substance of knowledge which we have concerning motivational theory. One of these men is David C. McClelland, of Harvard University, the other is Stanley Schachter, of Columbia University. McClelland and Schachter have attacked the same problem but they end up with different basic drives as explanations. Primarily, both men have concerned themselves with what amount to the upper echelons of the Maslovian Hierarchy, both appearing to be content with the assumption that the monitory levels of needs in the lower echelons of the Maslovian Hierarchy are satisfied as far as most people are concerned who have jobs in the United States. Fundamentally, Schachter attacks the affiliative motive of mankind at work, while McClelland directs his attention to what is termed man's achievement motive. How do these fit in with Maslow's basic theory? Let's take a look.

If one looks at Figure 4 it can be readily recognized that man's social drive is functionally equatable to a need to affiliate. By the same token it can be recognized that man's ego drives and need for self actualization is fundamentally a drive to achieve or accomplish something from his work. Schachter calls his theory the Affiliative Motive and McClelland calls his the Achievement Motive. It is argued here that these theories, while being very helpful to the practicing business manager in understanding what it is that motivates people to work, are really nothing more than an elaboration and detailed development of the general framework laid down by Maslow and others years ago. What precisely, however, are these theories and what relevance do they have at this point?

Basically, the Affiliative Motive explains the social drive as developed by Maslow. It can be explained as follows: Because man is a social animal, he likes to interact and be with other people. He likes to feel as if he belongs and is accepted. While this is a very common need in all people, it tends to be stronger for some people than others and a good deal stronger in certain situations — thus emerges Schachter's explanation of the person who demonstrates a tremendous need to be a friend at work.

The really important point to recognize about the affiliative motive — and thus Schachter's major contribution — is that people's intense need to affiliate with each other may become a controlling factor in the amount of work which they do. For example, Schachter reports that when people are at work (no matter what their stage of morale) they want to be with others who are "in the same boat." In short, misery doesn't just love company, it loves being around other miserable people. Just so the successful don't like listening to cry babies, but prefer to be around other successful people.

All of Schachter's work tends to support the fact that management may be justified in being suspicious of informal work groups, especially those tied together by strong affiliative ties. It is certainly possible that people in such groups can, and many times will, reduce productivity, or at least hold back because of feelings of loyalty toward their buddies. It can be argued from the affiliative motive standpoint, that when people in a work group have a feeling of insignificance or impotence in controlling their working lives, they may develop a dislike for management and managerial goals with consequent effects on productivity. Low productivity is not, of course, the only result of informal work group loyalty. High morale in a work group can increase productivity, too. The point is, according to the Schachter affiliative motive, productivity of the work group largely depends on how the group members see their own goals in relation to the goals of the organization. Group feelings will tend to pre-dominate and determine behavior, for the most part, in this theory. However, for purposes of integrating this theory with the Maslovian Theory, it may be re-worded as follows: One's affiliative drive will determine his relationship to a work group and his productivity (or lack thereof) will be a function of his need to socially do what the group wants him to do.

Achievement Motive and Performance

The achievement motive is another of the motivation drives which wins a certain amount of acceptance when it comes to understanding motivational theory. As can be seen from looking at Figure 4, the achievement motive probably fits into the two upper levels of the Maslovian Hierarchy of Needs.
According to McClelland, who has done most of the work reported on the achievement motive, his research has led him to believe that the need to achieve is a separate and distinct human motive, one which is different and identifiable from any of the other motivational drives of mankind. Basically, the gist of the achievement motive is that man will attempt to challenge himself at work, to see how good a job he can do, being careful not to make it too easy for himself or too difficult for himself in the challenges which he undertakes. In terms of people's behavior at work, this usually means that the highly achievement oriented individual will set moderately difficult, but potentially achievable, goals for himself by way of job performance. Furthermore, another characteristic of the person with high achievement need is that he is more concerned with his personal achievement on the job than he is with the rewards which come from successful accomplishment of that task. In short, he gets a bigger kick out of winning than he gets from the praise or glory which he receives from having won (or done a job well).

The reason achievement oriented people behave as they do is because they habitually spend most of their time thinking about doing things in a better way. McClelland has found, for example, that wherever people regularly think in terms of achieving things they tend to accomplish more in a shorter period of time. McClelland has also found that achievement motivation is more commonly found in middle class families, particularly in terms of individuals found in merchant, professional, managerial and salaried specialist types of jobs.

The mere fact that people with strong achievement motives tend to cluster in certain occupational goals, however, is indicative of an extremely important point which must be made about current motivational theory. That is, many people have a extremely high affiliative drives as pointed out by Schachter. Others seem to have an extremely high achievement drive, as developed here according to McClelland. While there is to some degree always an overlapping between the two motives, the two motives do not seem to coincide in the same people at the same time at an extremely high degree. Thus, one conclusion can be made from these two separate motivational theories. Some people top out or plateau at the social drive or affiliative level in the Maslovian Hierarchy (Schachter's Affiliative Motive); others tend to operate in the ego and self-actualization or achievement zone of the Maslovian Hierarchy (McClelland's Achievement Motive). The reason that some people are in the affiliative zone and others are in the achievement zone can probably be explained in a variety of ways, as is done both by Schachter and McClelland.

The explanation of this existing circumstance, however, is not as important as the fact that it does exist and fits the Maslovian Theory. More significantly, however, there is some reason to believe that the level at which one finds himself (that is affiliative or achievement levels) may be relatable to one's age. Therefore, let us now turn to some of the theories on aging and see how they, too, tie in to the Maslovian motivational scheme.

Concerning Aging

There are numerous theories which have been developed about people's motivational drives changing as they grow older. The physiologists, of course, have a great deal to say, as do the psychologists. The fact that there is a difference in man's motivational wants as he grows older is a common observation. So how does aging fit the basic scheme? Let's look.

One reasonably current psychologist, who has had some interesting things to say about aging, is Saul Gellerman. Gellerman develops a theory which he labels "Psychological Advantage." Basically, the theory of Psychological Advantage is that there is one basic, underlying order of logic to human behavior at work: People continually seek to serve their own self interests and these self interests change as they grow older. In substance, then, the theory of Psychological Advantage argues that people behave in an effort to serve their own interests, and these interests are a function of their perception of two things: their capability to do something and their opportunity to do something. Obviously, one's perceived capability and opportunity to do anything is a function of his age. Thus, logically, one is motivated at work to do things, but the things he is motivated to do are a function of his age.

An example of how one is motivated to do or not to do work becomes obvious from the following. Assume a man might like to be a professional football player, therefore is "motivated" to become one. But assume further, that the man is sixty years of age. Now most men in their sixties simply are not capable of playing professional football whether or not they have the opportunity to play. Thus the man won't play, even though he would like to. But consider another source of work prevention for the man. Most people who are in their sixties have the capability of being a good counselor of young people, but seldom have the opportunity to engage in effective counseling situations with younger people because they (the younger people) won't listen. Similar dichotomies between capability and opportunity can be developed for younger people.

In short, the theory of Psychological Advantage rests completely on one's perceived capability and opportunity, said perception being determined by his age. The implications of this theory are myriad. People go through various stages of perception as they grow older so far as their "psychological advantage" is concerned. One's Psychological Advantage at work can be developed into three distinct phases in one's working career of fifteen years each. Assuming the average person works for approximately 45 years in his lifetime, the first segment (age 20-35) is the age of young people, the second section (age 35-50) is the later working years. Figure 5 is an effort to encapsulate the various working years and people's motivational drives as they change.

As can be seen in Figure 5, the young man at work is motivated primarily by money, the pursuit of power, and what power will bring him. The reason for this is that the young man invariably perceives himself as both infinitely capable and unlimited as to opportunity. However, as the young person grows older and gets into his middle working years usually his motivational drives shift. Normally the person in his thirties and forties takes a little more realistic and conservative appraisal of both his capabilities and opportunities. Usually at this point he begins to recognize that opportunity is something which must be capitalized upon. As a result, he tends to assess himself as to whether or not he is moving along as he planned to as a younger man. If he does, he feels good. If he doesn't he feels bad. Normally his assessment is founded upon titles and position. Therefore, the person in his middle working years experiences a shift of interest (and thus incentive) to titles and other accoutrements of his job which indicate that he is being successful. At this point his is very concerned about what others think of him.

Finally, of course, the employee

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gets old enough that he is in his later working years, age 50 to 65. At this point, the man's perception of his capability and opportunity, in most cases becomes crystallized. Here the individual knows whether or not he had the kind of capability he thought he did and whether or not he took advantage of that opportunity which befell him. As a result, he tends to take a great deal more pride in his absolute functioning on the job rather than in his title or position or the money he is making. After all, being important isn't so important to the older employee simply because he recognizes that his working time is rather short. More specifically he is interested in the pleasure of doing the job and the prestige which comes from being in a position to be able to do that job and to do it well. At this point in time the man is usually more interested in quality than quantity.

**Aging and the Hierarchy of Needs**

We are now at the point where we can tie together several of the above theories, mainly, Maslow's Hierarchy, Schachter's Affiliative Motive, McClelland's Achievement Motive, and the Aging Theories. It has already been developed in Figure 4 that the Achievement and the Affiliative Motives can be placed upon Maslow's Hierarchy. Now it should be obvious that Figure 5 (the Aging Theory) will also fit nicely over the Maslovian Hierarchy because, in essence, it can be broken down on the same basis and covers the same subject matter as is presented in Figure 4. That is, the young man does tend to perceive his Psychological Advantage as lying along the lines of money and power, thus pursuing Maslow's Physiological and safety/security needs. As the young man enters his middle years he tends to concern himself more with what others think of him (Maslow's social plane) and in his later years he concerns himself with the pleasure of doing the job, prestige and other qualitative factors (all which can be included in Maslow's ego and self fulfillment planes). Figure 6 is an effort to superimpose these two ideas on each other. (i.e. Figure 4 and 5 add up to Figure 6.)

**Relating Herzberg's Work**

We have already pointed out how it is possible to superimpose over the top of the Herzberg satisfier/dissatisfier chart the Maslow Hierarchy of Needs chart. We also saw that we can superimpose the Aging Theory over the Maslow Chart. However, it still remains to be seen if it is logical to conclude that the three basic charts (i.e. Herzberg, Maslow, and Aging) can all three be tied together in a meaningful sense. Let's analyze it.

It is open to debate whether or not there is more validity to making the suggestion that younger people are more motivated by money, older workers are more motivated by the pleasure of doing the job and the thrill of working and middle year employees are more motivated by title and recognition. Fortunately, however, in a way relevant to this particular question, we do have some work done on the Herzberg theory which does tend to show a possible relationship, albeit on an empirical base. This suggestion comes as a result of the work of Scott Myers who extended the Herzberg analysis on a broader plane and applied it to more people.

Myers, in the report of his study of motivational drives of people at Texas Instruments, elected to study engineers, scientists, manufacturing supervisors, hourly male technicians and female assemblers. In addition to basically substantiating the Herzberg findings he did serve to provide one substantive bit of information which serves to tie the Herzberg theory to the Aging Theories. Let's see how.

Myers found that people basically were satisfied by the same factors at work as did Herzberg's study and that they were basically dissatisfied by the same factors. Therefore, the basis of Myer's and Herzberg's work is very close and there is argument, as we have said, substantiating the fittings of the Herzberg work on top of the Maslow Hierarchy.

Continuing with Myers' research, however, a very interesting conclusion is drawn by Myers. He differentiates between what he called Maintenance Seeking people and Motivation Seeking people. In Myers' terms, Maintenance Seeking people were groups of people who had a motivational drive primarily triggered by the nature of their environment and who tended to avoid motivational opportunities. In short, he said that these people

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**FIGURE IV**

A Self Actualization

- Achievement Motives (McClelland)
- Affiliative Motives (Schachter)

**FIGURE V**

| Later working years (50-65) | Motivated by prestige and the pleasure of doing a job well |
| Middle working years (35-50) | Motivated by titles and what others think of them |
| Age of youth (20-35) | Motivated by money and the pursuit of power |

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(Maintenance Seekers) realized little satisfaction from accomplishing anything at work and expressed cynicism regarding the positive virtues of life in general. Furthermore, they show little interest in the kind and quality of the work which they do.

Motivational seekers, on the other hand, in Myers' terms have a different outlook. The Motivation Seeker is primarily interested in things such as achievement, responsibility, growth, advancement, work itself, and earned recognition. These people are motivated primarily by the nature of the task which they have to do. They have a rather high tolerance for poor environmental factors.

To summarize the gist of Myers' finding, one can logically group Maintenance Seekers on the left hand (or dissatisfying side) of the Herzberg Motivation Hygiene Theory (see Figure 7 and 2) while the Motivation Seekers can be classed on the right (or satisfying side). The important point to recognize is that, in Myers' words, people find themselves in one group or the other but, "...an individual's orientation as a Motivation Seeker or a Maintenance Seeker is fairly permanent." Thus, while it is possible for an individual to develop from a Maintenance Seeker into a Motivation Seeker and vice versa, it would appear that he is reasonably locked in to his position. Furthermore, Myers goes on to say that if a person is working in a particular group (say Maintenance Seekers) he is very apt to become a Maintenance Seeker and vice versa. It is also interesting to note that Myers found out that certain groups he studied (e.g. scientists) were more Motivation Seeking in orientation while other groups (e.g. the female assemblers) were more Maintenance Seeking in orientation. But anyone, in any group, has his directions and outlooks — his perception — shaped by his having had both the opportunity and capability to be placed in one group rather than another.

This all argues for the prospects that some people simply never climb the (Maslovian) motivational hierarchy entirely, while others do, even though they grow older. This is a fundamental precept which Maslow first set down years ago — that people may never get to the top of his hierarchy. Such growth rather caused by historical accident — the position in life to which one is born, and how, in his formative years, he perceived himself as having both the capability and opportunity to be a scientist, rather than a manufacturing supervisor or a female technician.

Additional support for the above suggestions came from the observable fact that those in Motivation Seeking groups begin work later in life and retire at a later age than Maintenance Seeking people. Thus, one is inclined to argue that there is a relationship between people's motivational drives and how they change as they grow older and there may be a corollary shift from the lower order of needs satisfaction to the higher order of needs satisfaction as one grows older, depending upon one's early age perception of his capability and opportunity. At any rate the reader is invited to prognosticate about the overlapping of the Herzberg/Myers satisfier/dissatisfier motivational schemata upon the top of the Maslovian Hierarchy of Needs, as modified and reinforced by McClelland, Schachter, and the various theories about changing motivational drives as one ages.

Concluding Questions
The above exploration into current motivational theory has served the purpose of attempting to synthesize the best portions of current motivational theories. It certainly does not answer any real questions — questions which businessmen wish to have answered about motivational theory. The primary of those questions is "What can the manager do to motivate his employees?" While much heat and very little light has been generated on this subject, it must be understood that this is because most theories of motivation add little or nothing to that which we absolutely know. For example, recent efforts at understanding man's motivations at work don't answer the question of whether there is a more latent form of motivation. For example, today's youth will argue that their motivational drives are of the high, lofty caliber of those which we are attributing to the more aged among the working population. But then an anachronism occurs, for today's youth will argue that you cannot trust anyone beyond age 30, either.

A second question which can be raised is "Is it necessary to do anything to motivate an employee even if we did know how?" Many will argue that simply understanding what it is that motivates people at work.

In final substance we have one question which must be asked. Must we necessarily hope to highly motivate all people, or is it legitimate to recognize and accept people "as they are," without trying to change them "for the better" and, if necessary, get them to perform more quality or higher quality work? Obviously most managers are not content with letting people be as they are.

Thus, the real conclusion must be faced: There is little, if anything, that the manager can do to motivate people. Human motivations are simply what they are, a function of one's life style, educational background, and early upbringing. They are, after all, not a manipulable thing unless our current motivational theorists come up with some new tricks.
RAY SHRECKENGOST has a long-term familiarity with incentive programs. After working on the development of novel guidance systems at the Applied Physics Lab at John Hopkins University he was employed at the Martin Company in Orlando, Florida, where Zero Defects, as well as a strong Incentive Awards Program, was instituted by the General Manager, G. T. Willey. Mr. Shreckengost is currently a Special Assistant to the Deputy Director for Science and Technology at the Central Intelligence Agency, and a member of the Suggestion Awards Committee. His academic background includes an MS degree in Physics, an MA degree in R&D Management, and a MPA degree in Public Administration.

The importance of Suggestion Systems to organizations and individuals has never been greater than it is today. But the role of Suggestion Systems will change dramatically and become even more important in the immediate future.

At the Governors’ Conference in 1968 President Nixon said, “The central race in the world today is neither an arms race nor a space race. It is a race between man and change.” He was concerned with man’s ability to manage his environment, and make Government governable. The race with change extends to all facets of modern life — and since Suggestion Systems programs are primarily concerned with stimulating and assessing changes, they should also facilitate change, and assume a leading role in the race with change.

What’s New

It would be comforting to assume that because people change very slowly their environment changes slowly, also. For millions of years this was true, but for the last 300 years or so man has been changing his environment in remarkable and revolutionary ways. The attitude of “business as usual” can seriously impede the effective development and conduct of an adequate Suggestion Systems program.

To appreciate how this has come about, and to consider the prospects for the future as well, it is important to understand a bit about the nature
of the fuel which sustains the furnace of change. The fuel is technology, and the status of technology today is unique in the history of the world—and our society. As Derek de Solla Price has carefully shown, the number of scientists and engineers in the Western World has grown at a rate of 5 or 6 percent over the last 300 years, but the population as a whole has grown much more slowly. To look at it another way, the number of scientists and engineers, the primary change-makers, has doubled over 12 to 15 years. Although the doubling period for the total population appears to be growing shorter, 32 years is probably a reasonable estimate for the length of the last doubling period. Because the growth for scientists and engineers has been so great compared to the total population, a substantial proportion of the labor force now consists of technically-oriented people. As a result, greater changes have taken place in the last few decades than occurred in all of man’s prior history.

Not only does this large number of change-makers in the labor force increase the number of innovations and inventions but, in addition, the number of fields in which these changes occur has also increased. For example, the report of the Panel on Invention and Innovation pointed out that in 1945 the television, jet aircraft, and digital computer industries were commercially non-existent. Only 20 years later more than 900,000 people held jobs in these industries, and they contributed more than $13 billion to the Gross National Product.

The magnitude and scope of the changes with which we must now deal are so great that one leading management consultant, Peter Drucker, entitled one of his recent books The Age of Discontinuity. Rather than evolving, new industries and other activities seem to spring up overnight—creating demands for new skills and requiring new ways of doing things. Concurrently, the need for some established enterprises may suddenly diminish or disappear. Disestablishmentarianism has no greater ally than technology.

While Drucker has emphasized the impact on organizations, Alvin Toffler has spelled out in alarming detail the affect which changes may have on people. In Future Shock he speculates that we may be approaching the upper limit of the ability of people to adapt to a changing environment. Only a few weeks ago an article in The Wall Street Journal reported that psychiatrists have found a rising incidence of depression in the United States. It would be difficult to say that this was occurring precisely for the reasons Toffler suggested, but, nevertheless, it constitutes an additional indicator of how seriously frequent, unexpected changes may affect people as well as organizations. The Temporary Society, a book by social psychologists Warren Bennis and Philip Slater, further describes the crippling effects of a rapidly changing environment on both organizations and people.

What's The Problem

In the race with time, then, organizations and individuals alike are finding it increasingly difficult to keep abreast of the accelerating rate of change—irrespective of how resilient or adaptive they may be. The buggy whip makers occupy a far smaller niche in the industrial world today than they did a hundred years ago. But it is often difficult, if not impossible, for these organizations to move from buggy whips into the production of computers, jet aircraft, and television equipment. These organizations become casualties of the change process, and the landscape is increasingly strewn with the carcasses of organizations that didn’t make it. As the pace and scope of change continues to increase, and it becomes more pervasive, all organizations may be threatened with the fate of the dinosaurs. And it isn’t likely that the pace of change will slow up—society generally wants, and demands, improvements which can only be achieved by implementing the changes required to effectively exploit scientific and technical developments.

The changing demand for personal skills creates problems for individuals similar to those that beset organizations. Depending upon the circumstances, people may have greater or lesser flexibility than organizations; nevertheless, the impact of change can indeed be severe. In commenting on the pace of technological change, the National Commission on Technology, Automation, and Economic Progress observed that, “Our society has not met the challenge of technical progress with complete success. There is much to be done.” Recognizing the threat of technological unemployment, the Commission gave particular attention to the need for creating an environment which would facilitate the adjustment to change through both public and private policies.

The impetus for continual change stems from the fact that the benefits appear to substantially outweigh the costs. Technology, like Mephisto, offers to provide glittering, appealing benefits that are well nigh irresistible—and any sacrifice seems justified. In addition, there are many unmet, long-standing human and community needs which technology can assist in fulfilling. In fact, the very environment of work itself may still be further humanized through the incorporation of technical developments. Using a horse to pull a plow is certainly a much more satisfactory way of tilling the soil than doing it manually, and the large mechanized ensembles generally used in farming today represent further steps in reducing human drudgery in the production of adequate supplies of food. In many cases there is no alternative to more effective and efficient use of technology in moving towards the attainment of private, public, and national goals.

At the national level the problem of persistent change is also apparent. The United States cannot forgo the exploitation of technology—and thereby preclude the associated changes—if the standard of living in the United States is to be maintained. When Peter G. Peterson was the Special Assistant to the President of the United States—before he became the Secretary of Commerce—he prepared a review and analysis of the changing world economy. His report, The United States in the Changing World Economy, argues strongly that the recent decline of the U.S. position in foreign trade—particularly the unfavorable import/export balance—results from the shrinking scientific and technological superiority of the United States, and a failure to exploit adequately what is available. One of the great changes of recent times for countries has been the fact that the importance of the international market place, in comparison with the
importance of local or regional markets, is shifting.

**Suggestion Systems Can Help**

In these unsettled and unsettling times of great change, Suggestion Systems can be of great help to organizations and to individuals. Suggestion Systems programs have generally focused on activities likely to be of benefit to organizations. Suggestions are solicited which will reduce costs through improved techniques or procedures, and thereby enhance the position of any organization engaged in competition. Suggestions which can result in similar benefits are encouraged by non-competitive organizations, such as government agencies, but the benefits to the organization here may be more difficult to calculate.

Although direct savings are attractive, other types of benefits which may be realized through Suggestion Systems programs are of increasing importance. In *The Temporary Society*, Bennis and Slater present two essays: one of these, *Beyond Bureaucracy*, points out that rigid, pyramidal, hierachical structures are inherently fragile. In an environment of change they may be so unresponsive as to become a casualty. Here, Suggestion Systems can be important in heightening the awareness of the managers of such organizations to the kinds of changes needed within the organization, and, perhaps, the timing for such changes. In the essay, *Democracy is Inevitable*, the inherent adaptability of less formally structured organizations is stressed. In this kind of an environment, although it may appear less efficient, the inherent resiliency and ingenuity of individuals may be more effectively utilized to maintain the viability of the organization.

The important thing for both managers and Suggestion System leaders to keep in mind is that the lessons of the past, including concepts of management, may not work well in the modern revolutionary environment and, consequently, a greater organizational alertness must be developed. Suggestion Systems programs can play a critical part in developing this awareness.

Unlike the general thrust of the Suggestion Systems programs towards change for organizational benefits, many social researchers and writers emphasize the importance of the impact of change on the individual. In the long term, Suggestion Systems programs might well be more important with respect to the individual than to the organization, since ultimately organizations are dependent upon the people who comprise them.

For some time, Harvard University maintained a Program on Technology and Society. A Research Review issued in the Winter, 1969, *Technology and Work*, stated that:

> "The pace of technological change in industry has been a source of much public concern. In the late 1950s and early 1960s the literature on the subject was often characterized by the extremes of grave pessimism concerning the masses of people who would be 'thrown out of work by machines' and utopium optimism about the leisure society in which man would be at last freed from the burdens of labor."

It goes on to endorse the conclusions of the National Commission on Technology, Automation, and Economic Progress that technological change plays a major role in determining the particular persons who may be displaced, and that the rate of economic growth, rather than the technological change, is the principal determinant of the general levels of employment. Especially pertinent to Suggestion Systems is the idea in another Research Review, *Technology and the Individual*, which in 1970 stated:

> "Today, the focus of most discussions of technology and the individual tends to be on man's inner life. An advanced technological society, whether it is seen as increasing man's freedom or decreasing it, extending his sense of alienation or reducing it, seems to make individual adjustment a more complex process... It would be hard to imagine that technological change and the social changes it brings could leave the individual unaffected."

How can Suggestion Systems, then, help the individual cope with the increasing changes both in his personal relationships and his organizational life? For one thing, through Suggestion Systems programs, the individual can be given a sense of participation in the determination of his own future as well as his work environment. Suggestion Systems programs can provide a degree of orientation, enhance stability, and involve the individual in the development of goals and objectives which are of immediate importance to him. This can serve to reduce the apparent social disorder (for which Durkheim coined the term "anomic") and ameliorate the distressing effects of change described in *Future Shock* and *The Temporary Society*.

But Suggestion Systems programs can help in more than orientation. The research of a number of social psychologists who have studied the needs and roles of individuals in organizations suggest additional ways in which participation in Suggestion Systems programs may be beneficial to the individual. David McClelland, for example, has stressed the inherent need of many people for tangible achievement. The Suggestion Systems program encourages the participation of these people who are often creative and ingenious, as well as practical, and provides an opportunity for satisfying this need for tangible achievement. Maslow's work, and other studies, emphasize the importance of self-actualization in the overall satisfaction which an individual may enjoy. Again, the opportunities provided by Suggestion Systems programs may contribute significantly in this area, and substantially enhance employees' attitudes toward their jobs.

Rensis Likert has shown, through studies of a variety of organizations, that attitudes ultimately are reflected in individual performance, and individual performance ultimately affects the performance of the total organization. Consequently, to the degree that Suggestion Systems programs can improve employee attitudes toward change, desirable behavior may be expected and a viable organization assured.

Robert Hart, a Suggestion Awards Coordinator, in an article entitled, *Suggesting People Out of Jobs*, described the reluctance of people to propose or adopt suggestions in which jobs might be abolished. He argued that so long as there was a net benefit to the economy in terms of reducing cost, the overall result was desirable. But a broader view should be encour-
aged. Although some apparent savings may be achieved in a narrow sector, the costs of unemployment benefits, overhead for administration, and, in addition, the unemployment, or under-employment, of willing workers all constitute costs to society.

The need for a better, more comprehensive approach is obvious. The total problem must be considered so that economic benefits (which are often easily measured) are not achieved at the expense of greater costs in other areas (in which the costs are less tangible). In his President's Message this spring, Charlie Foos said, "Lately we have seen the revision and updating of several Suggestion Systems with the purpose of making them more attractive to the employee and more productive for the employer." Before Suggestion Systems programs can make their greatest contributions, a truly supportive environment must be created and maintained so that the employee is not threatened by participating in the program.

Aside from the inhibitions to participation resulting from a conscious or subconscious fear of job loss, there are many other reasons why suggestions and Suggestion Systems programs may not be enthusiastically supported. James Bright has detailed a dozen reasons why innovations are opposed:

- To protect social status or prerogatives.
- To protect an existing way of life.
- To prevent devaluation of capital invested in an existing facility, or in a supporting facility or service.
- To prevent a reduction of livelihood because the innovation would devalue the knowledge or skill personally required.
- To prevent the elimination of a job or profession.
- To avoid expenditures such as the cost of replacing existing equipment, or of renovating and modifying existing systems to accommodate or to compete with the innovation.
- Because the innovation opposes social customs, fashions, tastes, and the habits of everyday life.
- Because the innovation conflicts with existing laws.
- Because of rigidity inherent in large or bureaucratic organizations.
- Because of personality, habit, fear, equilibrium between individuals or institutions, status, and similar social and psychological considerations.
- Because of a tendency for organized groups to force conformity.
- Because of reluctance of an individual or group to disturb the equilibrium of society or the business atmosphere.

These really sum up to a fear of any change in the status quo. But much of that fear and apprehension can be reduced if Suggestion Systems programs are seen as a means by which the suggesters are better able to influence their own destiny.

A growing number of indicators tell us that public concern is increasingly swinging from the generation of profits to the generation of richer and more meaningful lives for more and more people. Much remains to be done. The lot of the disadvantaged, the uneducated, the migrant workers, and the unskilled still tends to become increasingly difficult. In fact, some cynics go so far as to cite the transition from labor scarcity to job scarcity as a crowning achievement of science and technology. Perhaps ways to slow or reverse this trend can be identified through Suggestion Systems.

Implications for Suggestion Systems

It is important for Suggestion Systems managers to clearly recognize the new, critical, expanded scope of the role of Suggestion Systems programs. These new responsibilities—and opportunities—for Suggestion Systems must ultimately result in associated changes in the role of the managers of Suggestion Systems programs. After all, Suggestion Systems are, in fact, in the thick of the process of change.

The recognition of the impact of change is not restricted to American leaders. Mao Tse-Tung has said, "Conditions are changing all the time, and to adapt one's thinking to the new conditions one must study." And also, "We can learn what we did not know. We are not only good at destroying the Old World—we are also good at building the New." To those who are apprehensive about the possibility of suggestions destroying the old, Suggestion Systems programs must clearly demonstrate an ability to build the new. A few study items might be considered by the National Association of Suggestion Systems which could help Suggestion Systems improve its position in its race with change—and demonstrate an ability to build the new.

Isn't there a need now for the development of better theory through which greater insight can be achieved about the role and management of Suggestion Systems? Why do participation vary so greatly among organizations? What are the important motivators? How do they relate to each other? How can Suggestion Systems programs be better oriented? When the problem of change is so great, and the environment so complex, a deliberate effort to provide better insight than that which may be derived from recent experience is certainly in order. It will not suffice to face the past with confidence and back into the future.

Isn't a Sociology of Suggestion Systems badly needed? Don't we need to know more about the motivations, the environment, and the attitudes which can contribute to the building of more comprehensive Suggestion Systems programs with benefits not only for organizations but people as well? Associated with the need for a better understanding of the Sociology of Suggestion Systems, and perhaps almost inseparable from it, is a better understanding of the Psychology of Suggestion Systems. And to the newcomer to Suggestion Systems programs, a History of Suggestion Systems could be most helpful. Perhaps efforts to satisfy these needs might be encouraged through grants, scholarships, or other devices.

After saying that the central race in the world today is the race between man and change, President Nixon went on to say, "The central question is whether we are to be the master of events, or the pawn of events." If Suggestion Systems leaders can generate a clear vision of their new and expanded responsibilities in the future, and initiate the studies which will be required to effectively meet these challenges, they can contribute significantly in helping to keep man in the saddle—and preclude the saddling of man.
TOM TROXELL is manager of Employee Participation Programs for the Aerospace Electronic Systems Department of General Electric Company, Utica, New York. His duties include supervising the Employee Suggestion Systems Program, Cost Improvement Program and Zero Defects Program. He has had assignments as the department's Value Engineer and in manufacturing assembly.

While these operations were under his management AESD has been the recipient of the Air Force Craftsmanship (1971) and the Sustained Craftsmanship (1972) Zero Defects Awards and has been a member of the exclusive General Electric Suggestion Plan "400 Club" for the past five years. Mr. Troxell is a graduate of Syracuse University with a BS degree in Physics and is continuing his studies for a masters degree in Business.

The prime objective of all suggestion programs should be to have the suggesters develop a confidence that they receive fair and impartial treatment by the Suggestion Board and Suggestion Program Administration. Without this confidence it becomes
Step III Develop a better way
work effectiveness, etc., were used to
Program by our employees. The
familiar guidelines of value analysis,
sustained acceptance of the Suggestion
management support. Contrary to
popular belief this support cannot be
bought, it must be earned by an
aggressive administration that
produces measurable results.

Step IV Implementation

Don’t delay. Take the necessary
steps to implement each change
which will improve the performance of your
office. Most of the changes will require only your
approval to implement, but may require formal presenta-
tion of all pros and cons of the proposed changes.

Some of these changes may require actual charting of both the present
procedure and the proposed methods, while others can be mental exercises.
Remember, it is not necessary to complete all four steps for each idea.
If an idea proves not feasible at Step II or III, drop it and go to your next
proposed improvement. If you see the obvious solution at any of the first
three steps, go immediately to Step IV.

Suggestion Boxes — Suggestion boxes have always been a part of sug-
gestion programs and many stories, cartoons, etc., have used the sugges-
tion box as a focal point. It may be very difficult to visualize a suggestion
program without suggestion boxes since the placing of a completed sug-
gestion in a box has been the accepted
procedure. We are in an age of rapidly
expanding technology and speed in
every phase is imperative. Change is an
everyday occurrence and anybody or
program that rests on past performance
cannot compete in this “Age of
Change.” Suggestion programs are no
exception. To survive they must
become part of this environment of
change.

An analysis of the purpose and use of the box shows that someone must
visit each box periodically to remove the suggestions. This visit, which
cannot be made daily in most plants, requires time and causes delays in
processing. Most plants have efficient
internal mail systems, therefore, the
use of this mail system to convey all
new suggestions to the suggestion
office is a definite speed-up in process-
ing.

The removal of suggestion boxes,
over three years ago, has resulted in all
new suggestions being processed daily.
This means that the submitter receives
the acknowledgement copy the day
following submittal and the suggestion
is in the hands of the evaluator within
one day of submittal. This fast
processing has the psychological effort of
couraging the submitter to con-
tinue participating and as a stimulant
to the evaluator. It shows that manage-
ment is concerned and this speed-up has resulted in faster evaluations and
pay-offs on adopted ideas. Also, it
means that many adopted ideas are
put into effect weeks earlier than
previously.

The benefits of this improvement
system are documented in the sub-
mittal statistics. We have averaged
more submittals per eligible employee
over the past three years than during
the period the suggestion boxes were
utilized.

Envelopes — The use of envelopes
for all mail is another standard. These
envelopes cost money, require address-
ing, stuffing, securing and opening.
When you administer a very active
program the amount of time con-
sumed using envelopes amounts to a
considerable number of hours per
week.

The purpose of the envelope is to
shield the contents from damage and
prevent reading while in transit. With
an efficient internal mail system the
damage to mail while in transit is
minimal. Also, the information con-
tained in suggestions is not classified;
therefore, problems with reading of
mail are not incurred. Presently the
original suggestion, acknowledgement
copies, investigator’s copies, replies to
submitter’s, acceptance and non-
adoption notices are mailed without
envelopes.

All forms were converted to self
mailer. This has resulted in a definite
speed-up in processing time and a
reduction in clerical effort in both the
Suggestion Office and in the office of
the recipient of the letter.

Awards — The actual handing of a
suggestion check by a member of
management to the submitter of an
adopted suggestion has been one of the
long standing rules of suggestion
programs. It serves a number of pur-
poses and its effect should not be
minimized. Some of the benefits are:
it shows management support and
interest and the public display of the awarding of the checks is a stimulus to the recipient and to fellow employees.

This method of awarding the check results in additional administrative efforts in both payroll and suggestion office. The same objectives are now achieved by the presentation of an award certificate and having the award money distributed with the weekly pay check.

This change has cut administrative cost and has had no adverse effects on the program and a fringe benefit is the shortening of processing time.

Suggester-evaluator team — A review of various suggestion plans shows that many pages are devoted to encouraging the eligible suggesters to participate and to the benefits for the manager/foreman. Very little is written on encouraging the evaluator who is very seldom the submitter's manager/foreman. Yet he is a key man to a successful program. Without his cooperation it becomes increasingly difficult to maintain a sustained level of performance.

If the evaluator does not have a positive attitude toward the acceptance of ideas from others, it will result in a delayed investigation or a high non-adoption rate. Therefore, it is imperative to the program to encourage the evaluator to respect other employees' ideas, to accept them without a feeling of guilt and to process suggestions assigned to him for evaluation promptly. This milestone must be achieved if you expect to operate a program at an above average level of performance.

In recognition of the important role played by the evaluator we have included him in roundtable discussions on the suggestion program and given him recognition in special promotions. The end result is that the percent of new suggestions processed during the first month has improved and the number of open suggestions over 60 and 90 days has been substantially reduced.

Promotions — A suggestion program will wither and die unless it is properly promoted and publicized. Promotions must be carefully planned for both long and short range benefits and so sustained performance is achieved. Promotions which only have short term effects, unless carefully

![Suggestion Program Performance Graph]

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<th>Year</th>
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designed, can result in increased activity during the actual promotion and a sudden drop-off after completion.

An analysis was made of past promotional efforts and their benefits and failures. From this analysis it was determined that promotion and publicity are necessary but they should reach all contributors — submitter, manager and evaluator; should have both long and short range plans for individuals and department.

The programs now being utilized by this department include:

Long range
1. A department goal to achieve the General Electric 400 Club — 400 approved suggestions per 1,000 eligible employees. This is a goal for all employees and management. It will be achieved in 1972 for the fifth consecutive year.

2. Continue the Suggestion Plan Hall of Fame — $500 in suggestion awards in one calendar year. Includes a luncheon with management. This program is eighteen years old and has resulted in approximately three new members per year. This goal is for individual contributors.

Short term
1. Continue the practice of having management present the suggestion award to the employee.

2. Initiate the printing in the plant paper of photos of submitter and description of suggestion on awards over $50.00 and printing of names of suggesters receiving awards of less than $50.00.

3. Special promotions to coincide with department, company-wide program or as required. These programs include submitters, managers and evaluators.

Unified Approach — In this Department each cost reduction activity traditionally had its own functional home — Cost Improvement had been a Finance function, Suggestions an Employee Relations function and Zero Defects a Manufacturing effort. These three programs had basically the purpose of improving the economic position of the Department. Each worked independently of each other. Each was promoted and publicized as a separate entity.

Since the purpose of these programs was to produce economies, a study was made of the administrative function of each program. This study showed that many similar administrative and promotional functions were performed by each program that could be combined into one work group at a lower total cost to the department. Also, that the interaction between the program specialists working in close proximity to each other would produce beneficial coordination and generation of new ideas. A close kinship existed between Cost Improvement and Suggestion Programs — each with primary cost reduction impacts and Zero Defects with primary improved performance and secondary cost targets.

Over three years ago these programs were combined into one function, Employee Participation Programs. This integrated effort has:

1. Mutually reinforced the effect of each program.
2. Assured integrated motivation.
3. Provided inter-related facets of inquiry and judgment.
4. Filled management’s need for a single channel of program direction and coordination.

This unified organization enhances value, communicates useful concepts upward through management levels and strengthens itself through coordinated motivation, operational consistency, awards and recognition, idea interchange and implementation techniques.

Average Award — A review of the annual statistical report shows the average award paid has a wide range between companies. Many of the organizations with high average awards also have low submittal and approval ratios — that is, number of submittals per 1,000 eligible employees. This means that they are only processing suggestions with tangible savings and the others, such as those affecting procedure, process, safety, etc., which normally have intangible savings and result in minimum awards, are not being processed.

An analysis of the Suggestion Program objectives shows that the program is established to develop and encourage a continuous flow of constructive ideas from eligible employees that will improve the way we do our business. This means a continuous flow of ideas regardless of value.

Professional employees have a responsibility for cost improvement and by the nature of their job assignments they are expected to come up with the large dollar savings. Eligible suggesters normally have job assignments which do not provide opportunities for very large savings. Thus, the Suggestion Program provides many small dollar savings which are beyond the scope of the professional’s day to day work. An effective suggestion system will have adopted suggestions that range from intangible or small dollar savings to a small percentage with savings in the thousands. We cannot and should not discourage this type of effort — to remain competitive, an organization needs every bit of help it can get.

Remember — The final product is the result of a gradual evolutionary process. The final quality product could be the result of one massive change, but more often it is the result of many small changes which, if considered collectively, have resulted in the massive change.

Other Improvements — These changes, which are not described in detail were the result of this analysis.

Projects for future improvements
1. Improved filing
2. Improved reports
3. Improved suggestion form
4. Revised evaluator assignments
5. Tracking of all open suggestions
6. Regular reports
7. Suggestion Board reassignments
8. Reduction in processing time

If the listed changes do not apply or if similar improvements have been made in your organization, they may trigger idea thinking which you may utilize to improve the administration of your office. This must be a never ending analysis, since no job or program is ever run so efficiently that no additional methods for improvements are possible. If an administrator ever feels that he can never improve his methods he will have difficulty when asking other employees to do the same.
$1.5 MILLION SUCCESS STORY

ARTHUR E. HARVEY, JR., the U.S. Army Missile Command’s “Mr. Value Engineering, 1968,” is the VE Manager, Land Combat Missile Systems. He is a charter member of the Society of American Value Engineers (SAVE); registered PE with a BS and MS in Chemical Engineering, Auburn University; graduate of the Army’s Command and General Staff College. He founded the Redstone Alabama Chapter, SAVE, and was president for three terms. He has published seventeen VE papers; conceived and produced six VE movies; and conducted six National or Regional VE Symposiums. He was awarded two First Place Trophies (Oscars) from Industrial Management Society’s National Film Competition for Movies “Value of the Law,” 1966 and “Value Management,” 1968. He received the U.S. Army Materiel Command’s Special Cost Reduction Program Award for VE contributions during FY 1968.

Mr. Harvey has been recognized by the Alabama Society of Professional Engineers and the Redstone Chapter of SAVE for his accomplishments. He is the recipient of the Meritorious Award (1966), Fellow Award (1967), and Life Member Award (1970) of the Society of American Value Engineers. Mr. Harvey is listed in Who’s Who in the South and Southwest, Who’s Who in America, Dictionary of International Biography, and Personalities of the South.

A cash Royalty Payment of $1.5 million? Unheard of! Did the Finance Officer make a mistake? No, there’s been no mistake.

Well, since royalty means a share of profits or a payment to some individual or company for each item sold under a royalty agreement, what kind of royalty are we talking about? A relatively new type called Value Engineering Royalty.

Under the Value Engineering Clause placed in DOD contracts, the contractor shares in the savings to the government resulting from his Value Engineering Change Proposals which are approved and incorporated. He shares in the savings from both the existing (or “instant”) contract and, for some limited period of time, in all future contracts in which the changes are incorporated whether or not he is the contractor. His share of this future savings is his “royalty” payment.

SHARING ARRANGEMENT

Value Engineering Incentive Clauses currently offer a sharing for the contractor of up to 75% of the savings in the instant contract and royalties of at least 40% for one year, 30% for two years, or 20% for three years. It is of special interest to note that, for royalty sharing, the Armed Services Procurement Regulations establish these sharing arrangements as minimums, the maximum rate being limited only by the instant contract sharing rate. So, for example, $1.5 million paid in royalty to a contractor means that the government’s share of the savings based on a 40% royalty to the contractor will still be more than $2 million. If the payment is based on a 30% royalty to the contractor, the government’s share of the savings will be $3.5 million.

What makes this particular event — this $1.5 million payment — so important is that we are only talking about: one contractor, one missile weapon system, and 77 approved and implemented VECPs; the largest royalty ever paid to a single contractor by any segment of the Army!

SUCCESS STORY

How did this come about? Did it just happen? No, it was made to happen. And this is the story of how “it was made to happen.”

In 1968, Colonel Robert W. Huntzinger was designated the Project Manager for the TOW Weapon System. To equip him for his new assignment, he was sent to the Project Manager’s Course at Wright-Patterson AFB for three months. On his return, he found that the TOW Project had a Value Engineering Goal, nearly half of the fiscal year was gone, and little of the goal had been accomplished.
Realizing that TOW did not have an organized strategy to meet its goal, and that he must patiently cultivate an understanding and enthusiasm for VE, he took positive steps to establish a proper environment and rapport both within his Project Office and with the contractor, the Hughes Aircraft Company. When asked how this was done, Colonel Huntzinger responded, "I realized that people, unfortunately, fear to 'reach out' beyond the pattern set by their environment. All change involves some risk — but people generally will not take more risk than the pattern of their environment permits. Often they do not even question a present method, practice, procedure, or design. Furthermore, many will not start or take any action which might embarrass their supervisors or organization.

CREATING AN ATMOSPHERE

"In my travels, I have noticed that the Army is seriously interested in appropriate innovations. It has been observed that a very small number of working engineers and scientists are responsible for most of the new ideas. Also, spending a lot of money doesn't necessarily achieve results. However, if the manager can create an atmosphere that will stimulate results by simply letting his people know that their creativity is needed, and welcomed — and that he really believes in them — then progress can be made.

"I realized that if the VE Program was to make headway quickly, we needed to study the past experiences in Value Engineering, extracting the lessons, evaluating the mistakes, and applying this experience with initiative to the problems of the present and the future. I also knew that the people concerned, both in-house and at the contractor's plants, must have a thorough understanding of the intent, objectives, procedures, and rewards of the TOW VE Program."

ACTION PLAN

And this is what was done — i.e., to promote a pervading spirit of enthusiasm, trust, and competence. A ten-point action plan was developed to achieve this goal:

1. A Value Engineer was assigned by the Missile Command's Value Engineering Division to assist the Project Manager's personnel and to function as a member of the Configuration Change Board, when VECPs were being reviewed.

2. The contractor was contractually guaranteed a generous share of the savings realized from any approved VECP.

3. The contractor was reassured that all of his VECPs would receive a prompt and objective evaluation, and that he would be promptly notified of rejection or acceptance. Suggestions would be made to the contractor as to how a rejected VECP might be revised to be acceptable. Clear and specific reasons for disapproval would be given in each case. If more information was needed for evaluation, it would be immediately requested, the contractor would be notified and an estimated date given for completion.

4. The contractor was encouraged to submit preliminary VECP ideas. If the idea was technically acceptable, he was urged to submit a formal VECP package, complete with all the technical, test and cost information. Such VECPs could then be more rapidly evaluated and processed. If the preliminary VECP was not acceptable, the contractor could stop the project without further investment of time and resources.

5. The Army TOW personnel were requested to establish a direct and clear working relationship with their contractor counterparts for the promotion of Value Engineering.

6. The contractor was advised that the TOW Project personnel would also be initiating Value Engineering changes, but that such actions would be coordinated with the contractor to preclude duplication of effort.

7. The contractor was asked to establish VE Programs with his subcontractors and vendors, similar to the one established between the TOW Project and himself.

8. The TOW Project and the contractor agreed to establish cost as a design parameter. The VE Program provides the designers and engineers with an effective tool to deal with costs. These personnel were reminded that they, more than anyone else, influenced the life cycle costs.

9. The TOW Project personnel were trained to recognize the need for Value Engineering to make TOW cost-effective in the face of competing weapon systems; likewise, the contractor personnel were similarly indoctrinated and persuaded to recognize VE as good business.

10. The TOW VE Manager and Command VE Staff pledged to visit the contractor frequently to review and assist him in his VE program.

Having been awarded a $141 million TOW production contract and recognizing that the Army was sincere in wanting an effective Value Engineering Program, Hughes Aircraft Company conducted, in January 1969, the first of several, three-week TOW Value Engineering Workshop Seminars for seventy-two men in its Tucson, Arizona, plant. To show its backing and support, Mr. J. A. Scanlan, the Hughes TOW Program Manager, as well as other top management personnel, attended the ceremony at the completion of the Seminar.

EMPHASIS ON VALUE

Mr. Scanlan, in his remarks at the presentation of certificates observed, "Our customer is placing increased emphasis on Value Engineering to reduce the cost of the TOW Missile System. Value Engineering is one of the most effective means of accomplishing this important customer objective, as well as significantly enhancing the profit potential of our company.

"This workshop has not only contributed significant ideas for reducing the cost of many components of the TOW System, but has dramatized the
importance of Value Engineering to all members of the Hughes TOW Team.”

ROADBLOCKS OF THE PAST
Like other Defense Contractors, the Hughes Aircraft Company sponsored a company-funded Value Engineering Program and continuous VE training programs. However, in some quarters there still lingered doubts about the practical benefits of VE. Previous VE experience with other DOD agencies had taught bitter lessons; for example: worthy VECPs were rejected for no apparent reason; months were taken to evaluate a VECP, when it could have been done in less than 30 days, and consequently much of the savings were lost; the government rejected valid VECPs and then incorporated them in the technical data package for the next buy; the Government accepted the VECP ideas but told the contractor the ideas must be classified as ECPs; or in some cases, VECPs were accepted but sharing in valid collateral savings was denied. Hence, there was still an attitude problem to be licked before TOW VE could gain momentum.

Colonel Huntzinger was still concerned in September, 1969, over this early “lack of momentum” problem.

In a letter to Hughes, he wrote: “With the first quarter of the fiscal year practically over, no results are apparent. It has been our experience that effort must be expended early in the year to complete and gain the benefit of the actions within that fiscal year. Vigorous attention to the Value Engineering Program is required now.

INTEREST REAFFIRMED
“Unequivocally, we reaffirm our interest in Value Engineering. Particularly at this time of tight budgets and rising prices, value must be obtained for every dollar spent, VE will assuredly result in a profit for your company and a cost reduction for us. Our full and expeditious support is pledged to your effort in this program.”

In reply, Mr. Scanlan explained “...We wish to assure you that the program is a continuing one and that the activity is being greatly accelerated now that initial production problems have been resolved and initial deliveries have been made.

“Our foremost objectives have been to meet schedules and to maintain previously demonstrated high levels of reliability. The introduction of too many changes too rapidly during initial production would not have been consistent with these objectives.”

He further stated that five VECPs had been submitted and several others were in various stages of completion. He ended the letter with this statement: “We are confident that the end result of work accomplished to date on Value Engineering and of future planned activities will demonstrate our sincere response to your expectation on this program.”

SUBContractors Involved
Mr. Wayne Boals, TOW Value Engineering Manager, Hughes Aircraft Company, supplemented Mr. Scanlan’s remarks by pointing out: “Though our company Value Engineering Program, new innovative ideas are created and evaluated continuously to further reduce the TOW costs. All divisions with any responsibility for TOW are participating. We encourage each subcontractor and supplier to participate in the VE effort. All TOW purchase orders carry a provision for the vendor to share in the savings of each VECP they originate.”

The program had started to move and by December 1969, the first 20 VECPs approved on the TOW launcher and missile produced $387,000 savings in current contracts with an additional anticipated savings of $1.4 million for future procurements.

SAVINGS Multiply
By 30 June 1970, the number of accepted VECPs had risen to 31 with the total savings of $1,381,400 of which the government’s share was $690,700. In FY 71 the savings were an additional $1,015,000 from 27 VECPs, of which the government’s share was $507,500. In FY 72 Hughes Aircraft Company submitted 61 VECPs which is the largest number ever received from a single contractor by the U.S. Army Missile Command; the anticipated savings from the 52 which were approved is an additional $5,633,800, of which the government’s share should be about $1,654,200. Clearly, the ten-point VE campaign strategy had worked.

And it is as a direct result of these accumulated savings that Hughes was presented with the $1.5 million royalty check earlier this year.

It is appropriate to note that at the royalty ceremony, when Mr. Wayne Boals presented the $1.5 million royalty check, Mr. Victor Ames, the Hughes Controller, as a portion of Hughes’ share in Value Engineering savings, he made the following statement:

“The TOW Program proves that Value Engineering can work and did substantially enhance the earning potential of our company because it was organized and pursued as a major program objective.

TEAMWORK ESSENTIAL
“A major factor in the success of the program has been the teamwork between engineering and manufacturing and their counterparts in the TOW Project Office at the U.S. Army Missile Command; in fact, the total dedication of everyone concerned at all levels in the TOW Program.”

The TOW VE success story is vivid proof that a well-organized VE Program can work — that it can produce significant benefits to both the government and its contractors. However, it does require planning, determination, an inquisitive spirit, and cooperation. And all of this can only emerge from a carefully developed environment. With these ingredients, you too may become the beneficiary of a $1.5 million royalty check.
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<tr>
<th>Title</th>
<th>Author(s)</th>
<th>Description</th>
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(Please print plainly)
JOHN W. ANDERSON, Vice President of Honeywell’s Aerospace and Defense Group, was appointed to his present post in October 1970.

Anderson joined Honeywell as an engineer in Minneapolis in 1941 and has served in the firm’s military and space programs for 27 out of his 30 years with the firm.

In 1957 he was a part of the management team that founded the firm’s St. Petersburg facility, and served successively as its director of engineering, assistant general manager and general manager. He was named vice president of the Florida facility in July 1966.

Mr. Anderson was vice president of engineering at the Honeywell Electronic Data Processing Division from 1961-63, and from 1963 to 1966 was general manager of its Aeronautical Division in Boston, the forerunner of the firm’s Radiation Center.

A native of Superior, Wisconsin, he attended Superior State Teacher’s College from 1933 to 1935 and received his B.S. in mathematics, and both a BSEE and BSME at the University of Michigan in 1939. Anderson did graduate work in electrical engineering and served as a research assistant at the Massachusetts Institute of Technology from 1939 to 1941.

What Management Expects Of Its Value Programs

INTRODUCTION

Value Engineers must realize that the subject, “What Management Expects from its Value Program,” is a loaded one. It implies that formal value programs either do or should exist in most companies. I think it also implies two questions of significant importance to Value Engineers: How does Management rate Value Engineering? and, What do they expect of Value Engineers? I must concur that these are timely subjects in need of careful consideration. It is now 10 years since President Johnson and Secretary McNamara kicked off a nationwide emphasis on Cost Reduction Programs – at least within Defense Industries — and, in the process, introduced Value Engineering to hundreds of companies. It does seem like time to take stock — to see what progress has been made — and to determine what impact or importance Value Programs, Value Engineering and Value Engineers have on the present and the future.

IS COST IMPORTANT TO A DEFENSE INDUSTRY?

The costs for Aerospace and Defense programs have been a steadily growing item of major budget concern to the people and to their government. In the past decade the cost of defense has been under especially close scrutiny. You can hardly pick up a newspaper without seeing new articles on Defense spending. Strong criticisms are made — often from the highest levels – of our choices of programs, the shortcomings in system performance, excessive cost and general mismanagement. Designs and hardware for these programs are largely produced by industry. Costs are, by necessity then, a major concern of industry. The more competitive Defense procurement is, the greater is industry’s concern for meeting its competition. This is the very essence of our competitive enterprise system.

In this same period of time, however, DoD has persistently moved to improve both its own and its contractors’ cost management techniques. Directives for intensifying the priority on cost, for increasing Program Management’s responsibility and focusing greater attention on Cost-to- Produce, Cost Reduction and Value Engineering have been painstakingly developed. So cost, as it relates to necessary performance, is unquestionably a major concern to DoD.

In any field as complex as Defense weaponry, there is certain to be technical obsolescence and unnecessary cost. Given a genuine chance, however, CONTRACTORS CAN REDUCE COST, and any contractor who can manage a truly optimum Value Program can’t help but tilt the competitive balance in this favor and help the economy of Defense as well.

WHAT IS AN OPTIMUM VALUE PROGRAM?

Design review, Producibility, Cost Reduction, Value Engineering, Employee Suggestions and Zero Defects are all programs having the common generic objective of value
improvement. Each individual program fills only a part of the total need, however. A mature Value Program should combine and coordinate such individual programs so as to assure that the most practical cost-vs-performance decisions are made at each program milestone, from the concept-to-the-grave, for any device, system or service. This may seem to be a large order of expectancy, especially considering the usual priorities on available time, the technical struggle to meet advanced performance criteria and the limitations on funding and manpower. But when Value consideration is truly an integral part of the development or production plan, and is considered a part of competent performance, it doesn’t need to add an appreciable burden.

Value Programs are often considered motivational in nature. The common concept of motivation is to offer some carrot of inducement which will persuade people to do something extra. A good value program must provide motivation and inducement, not because value is a desirable extra, but because it is a must! Optimum value should be an objective of any job well done. Management must be sure that every person knows, however, that whatever else his job may entail, the COST OF PERFORMING the job and the COST OF THE END ITEM to which his job is directed must also have priority; otherwise, he has not done a fully competent piece of work.

Under these conditions, motivation can be achieved through recognition of measured accomplishment toward total goals. It can be given in many forms, including monetary awards, where such are practical, and is part of the Management-by-Objectives concept.

We have found that a mature Value Program must include at least five very critical ingredients; they are these:

1. A very clear message, from top management, that identifies the importance and priority the company places on cost.
2. An equally clear message that specific cost improvement goals are the responsibility of each level of Management.
3. A well-defined PLAN for accomplishing goals at each level of management.
4. A procedure which identifies, but does not limit, the kinds and sources of value improvement ideas sought, and which provides the means of communicating, tracking, evaluating and implementing practical ideas.
5. A valid monitoring, measuring, auditing, and reporting system by which management sees both gross savings and the cost of achieving them; in short, sees the return on investment from its Value Program.

The Honeywell Aerospace and Defense Group has had a composite Value Program for eleven years. It embraces most of the discreet programs I named earlier including, I think, one of the finest Value
Engineering programs in the nation. Nevertheless, we fall far short of the total Value Improvement we, as a Contractor, could make! We are still growing, however, and so is the sophistication of Value Improvement Programs. We hope we know where we can and must go.

As part of our Value Improvement Program, we have strongly pursued the DoD, VECP sharing program since 1965. We count more than 300 VECPs submitted, more than 200 approvals, and over 170 implemented changes. They account for over $41 million dollars in contract savings. We have profited from that sharing — by about $15 million — and we saved the government more than $26 million over this period of seven years. Changes in ASPR, which I understand are currently under consideration, will, I believe, increase this kind of Cost Reduction significantly.

Our in-house cost reduction averages nearly four times as much in savings as our VECPs. We count on these to provide us a reasonable operating profit as often as possible. Reduced operating cost is, of course, reflected in our follow-on bids and contracts. We work cost reduction hard to help keep us competitive, and the result is real cost savings to our customers.

Perhaps the most beneficial aspect of any good Value Program is a focused effort during design and development to optimize the total life costs of the system. Value Analysis during bid preparation, Cost effective concept formulation, Value Engineering of designs prior to release and Productivity studies during the pre-production phases of development are all highly beneficial parts of our program. Future cost avoidance, however, is often difficult to measure. But we are working on measurement techniques such as cost-to-produce targeting, and measuring progress toward beating the target. We are anxious to see the right kind of contractual use of these techniques including competitive recognition and, possibly, incentives.

**WHAT SHOULD MANAGEMENT EXPECT OF A VALUE PROGRAM?**

Summarizing then, it is my belief that a comprehensive Value Assurance Program is as essential to a competitive enterprise as any segment of business, and management should expect it to provide strong competitive assistance, maintain or improve performance and help assure profit. It must also give a credible account of itself in terms of return on investment in the above three areas.

This is indeed a tall order, and perhaps no program can claim to be achieving optimum results in all categories. But neither can any other branch of business claim perfection. It is the degree of willingness to keep trying that makes winners.

If top management truly wants results, then it must commit itself to risking the investment money, manpower, and facilities for the program. And it must clearly communicate its objectives, assign the responsibilities and monitor the results; in short, SHOW ITS INVOLVEMENT.

**WHAT ABOUT VALUE ENGINEERING?**

I haven't said much about Value Engineering so far. Where does VALUE ENGINEERING fit in a viable Value Assurance Program, and what role should the VALUE ENGINEER play? Simply this:

"Value Engineering — when it is competently used by a professional who understands the depth of content of its relatively simple steps — is perhaps the most potent tool available today for attacking a cost or value problem."

But, VE is not the end item, nor is it the ONLY tool needed to make a comprehensive Value Program run effectively. Contrary to the early beliefs of some cultists, teaching Value Engineering techniques within a company, does not constitute the structuring of a Value Program. On the other hand, Value Programs which use Value Engineering techniques produce exceptional results.

The synergism of the team effort, espoused and practiced by Value Engineering, knits the various segments of an organization together to tackle a cost goal in a most effective manner. The virtues of trained VE study terms can't be overemphasized. But in our organization, at least half the useful value ideas come from individuals who contribute because an organized program exists. Each knows his role in the program objectives. Each has been taught the VE techniques and given the procedures with which to implement their ideas.

**WHAT IS THE ROLE OF THE VALUE ENGINEER THEN?**

A professional Value Engineer, or a professional Value Administrator can, and must be, much more than a tool. If he fully understands what I have tried to convey, he can be the catalyst who organizes the program plan, markets it to management, communicates the objectives, trains personnel, structures the procedures, identifies responsibilities, plans and coordinates activity, keeps records, and generally gives a businesslike account of the results achieved by all who take part in the program.

In short, he provides an essential SERVICE to the Program Managers who manage the cost, and who must account for their Program goals and financial success to top management.

**WHAT DOES MANAGEMENT EXPECT?**

As a management representative of Industry, it is hard for me to see how any competitive organization can survive today without the deepest concern for its costs and its customer value. As a citizen and taxpayer, I certainly expect government bodies and institutions to feel the same way about services to their constituents. To me, that means having very specific programs which assure that cost and value get the necessary priority at every level of decision-making.

Management should expect a Value Program to help perpetuate the company. They should expect Value Engineering to provide the working substance of the program. They should expect Value Engineers to professionally service the program. If the Value Engineer doesn't do it, someone else must. Therefore, a Value Engineer must think and act like a Manager.
Some Selections available from the NASS LIBRARY

ADMINISTRATION AND POLICIES OF SUGGESTION SYSTEMS
- "New Suggestion Plan Saves $30,000 First Year" D. M. Allen, Los Angeles Department of Water & Power
- "Encyclopedia of Management" Carl Heyel (Reinhold Publishing Co.)
- "The Organization of a Suggestion Plan" D. W. Brawley, Workmen's Compensation Board
- "Installing our Idea Plan" B. D. Brown, Kimberly-Clark
- Handbook of Modern Office Management

BENEFITS AND PITFALLS OF SUGGESTION SYSTEMS
- "Program through the Power of Mist" J. L. Turner, NASS Newsletter
- "Are Suggestion Systems Worth the Problem?" Charles Fox, Manager Suggestion Program United Air Lines
- "Suggestion Systems, Boom or Bust?" C. Y. Young, Personnel Journal

THE COMMUNICATIONS ASPECT IN SUGGESTION SYSTEMS
- "Peep What You Practice" H. C. Wardle
- "From the Supervisor's Viewpoint" E. Walker, General Motors of Canada

SUGGESTIONS FROM SALARIED EMPLOYEES
- "Why Collier People Have Ideas Too" F. A. Davis, NASS Quarterly

MANAGEMENT'S ROLE IN THE SUGGESTION SYSTEM
- "The Supervisor: Role in the CTA Employee Suggestion Plan" Chicago Transit Authority
- "Top and Middle Management Support of the Suggestion Plan" A. E. Smith, General Motors Corporation

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- First National City Bank of New York
- General Motors Corporation
- Goodman, B.F.
- General Motors (Fort Worth)
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- General Foods Corporation
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- Illinois Central Railroad
- Imperial Oil Limited (Div. of Standard Oil)
- IBM (Deutschland)
- John Hancock
- Jones & Laughlin Steel Corporation
- Liberty Mutual
- National Bank Company
- (and many, many more)

Some Selections from our Hardcover Library

- "Communicating With Employees" Complete Management Library Volume XVII, Robert P. Cost
- "Every Employee a Manager" McGraw-Hill, M. Scott Myers
- "Improving Your Creativity on the Job" American Management Association, Inc.
- "Motivation and Productivity" American Management Association, Inc.
- "Management by Motivation" American Management Association, Inc.
- "Suggestion Systems are Profitable" Complete Management Library Volume VIII, W. C. Whitwell
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NORTH CENTRAL SAVE CONFERENCE HELD

Over 100 representatives of commerce, industry and government attended the SAVE meeting in Detroit, some from as far away as Switzerland. Principals in the conference leadership were (left to right): Michael Pinto, SAVE NCR vice president; Frank Clark, conference general chairman; Keith P. Mazurek, Keynote Speaker and vice president of International Harvester Co.; Arthur R. Karstaedt, assistant general chairman; Victor Geubard, manager of manufacturing for IHC; and Richard J. Park, assistant general chairman.

SCRAP PROBLEM?

If your company has a high scrap rate or just plain waste, try telling your people to operate as though they were operating their own plant. "Do for us what you would do for yourself; manage your job as you would if you owned the plant." The results of this approach may be surprising.

CUSTOMER RECOGNITION EARNs AWARDS

Want to give an employee a deserving award? Excellence in customer service is a goal award program for sales and service personnel at Firestone Tire & Rubber Co. To get the award, a salesman or service worker must be commended by a customer in a letter to the company. Lawrence Lombardo, vice president of sales, states that, "We are finding that more and more of our customers are taking the time to write us and point out what they feel is exemplary service by our employees and dealers." And it helps job performance, too.

CRAFTSMANSHIP AWARD

The Zero Defects Craftsmanship Award was recently presented to only the second Naval Shipyard to receive this coveted award. Shown is plaque and flag being given to Philadelphia Naval Shipyard Commander, Captain J. B. Berude, by Commandant, Rear Admiral K. L. Veth.

NAVY VENDOR EVALUATION PROGRAM

Guidance in the selection of vendors is proceeding with more detail input due to the development of the NAVSHIPS Vendor Evaluation Program (NUVEP). Data is used from three basic sensing areas: (a) receipt inspection records (including the population), (b) vendor survey reports, and (c) unsatisfactory material reports. Vendor corrective actions, or failure to take corrective actions, are factored into the data, making the system capable of reporting the up-to-date responsiveness of a particular vendor. This source material is analyzed and a "Specified Vendors List" is distributed to assist activities in concentrating their procurement quality control efforts more effectively.

Vendor performance data is used by participating activities to: (a) help make better contract award decisions, (b) determine if a pre-award survey would be advantageous, (c) determine if mandatory government inspection actions should be issued to DCAS, (d) determine the degree of receipt inspection that should be applied, and (e) seek out alternate sources by reviewing commodity runoffs and soliciting bids from vendors with low rejection rates.

The program has been reviewed and endorsed by DCAS Headquarters, Cameron Station. Furthermore, DCAS Headquarters has advised the regional DCAS offices that the NUVEP program is compatible with ASPR and has requested that the regional DCAS offices support the program. All data generated by the program is made available to DCAS Headquarters and periodic visits (one DCAS region per month) are made by NUVEP personnel to discuss particular vendors who are located in the area under the cognizance of the DCAS region visited and who appear on the SVL.

The program provides the mechanism for mutual sharing of vendors survey results. When a vendor represents a serious problem for more than one shipyard, NUVEP has been authorized to conduct surveys on behalf of all activities. This has resulted in a cost savings.
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