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Value Analysis Philosophy

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PRODUCT IMPROVEMENT is a necessary way of life. Here is a simple statement with which most people will agree, and yet take a closer look at the picture which these words may create in the minds of different people.

The inventor or creative designer foresees the need for the generation of new or vastly improved products to meet various functional requirements of the expanding industrial and consumer markets. Manufacturing or production engineering picture changes to improve producibility. Quality control people would look for improvements which reduce scrap or rejection. Each person would visualize certain changes which would affect the product in different ways in accordance with his own areas of interest and responsibility. Some would look for product performance improvements; some would look for producibility or economic improvements.

People would consider different reasons for the necessity of these improvements, such as human welfare, competition, production capability, or profit. It can be seen that even a simple statement consisting of commonly known words is open to misinterpretation and misunderstanding. If this is true, one can easily forsee the difficulties arising when new words or phrases appear upon the scene. With increasing complexities of products, industries, and technologies, new words and phrases depicting areas of various new philosophies, techniques, sciences, and activities are being coined almost daily.

Now we are going to be talking about two words - Value Analysis. Two words which identify various things to various people. Two words which define an area of specialized activity which has, within the past 15 years, come onto the business scene. The purpose of this presentation is to clarify in your minds the meaning of these words and the philosophy which they define.

The words value analysis relate to the word improvement, because they define a system which helps people make improvements - improvements primarily aimed at eliminating all unnecessary costs associated with products.

Webster defines philosophy in several ways:

1. The science which investigates the facts and principles of reality.
2. The science which combines logic and theory of knowledge.
3. The body of principles underlying a given branch of learning.

So when we talk about value analysis philosophy, we are attempting to identify a specific body of knowledge or principles. If this knowledge can be described in sufficient detail, a common concept or picture can be created in the mind of the listener.

First, look at the broad picture, then scrutinize the details. Value analysis and value engineering are the most common terms used to identify the body of knowledge. The terms are synonomous in regard to what they identify. Some people have interpreted the words value analysis or value engineering to designate different points of application and different amounts of applied engineering skills. However, these are fine variations we are not concerned with presently nor will these differences materially alter the philosophy of value analysis.

Value analysis is the organized application of a system of specific techniques. To state it another way, value analysis is a systematic approach using a package of basic techniques. While this gives a picture of what the words value analysis identify, it does not define the body of knowledge. This consists fundamentally of the "approach" and the "techniques."

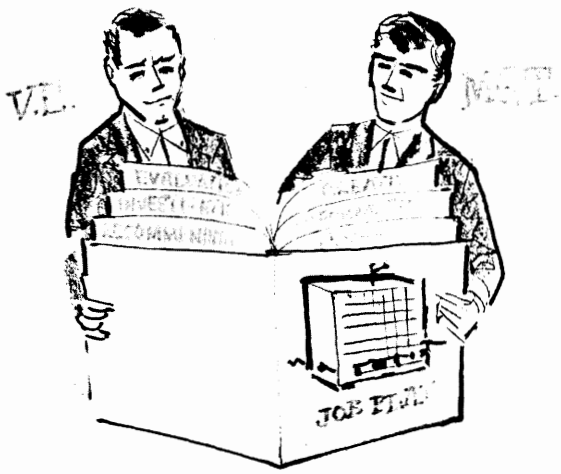

Fig. 1 - Review of job plan by management

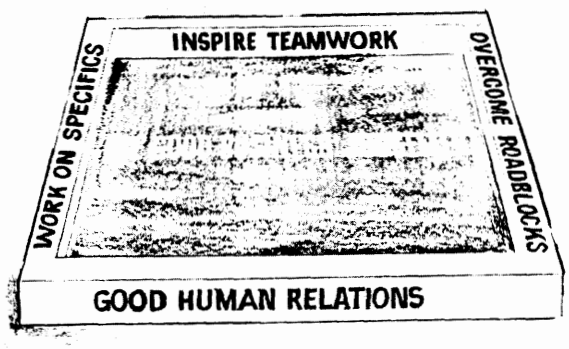

Fig. 2 - General techniques fundamental to foundation of value analysis

The value analysis approach is called a Job Plan and serves as the structure which houses the techniques. To more clearly define the broad package, we can erect a structure or building consisting of the job plan and techniques. Let's review this job plan in order to establish a more uniform concept of the value analysis philosophy and the specific techniques which fit into the structure.

Value analysis is a business management tool which will materially add to the profits through the increased capabilities of decision making people to utilize the value analysis system. Management should review this job plan or system with a qualified value analysis specialist to determine the best implementation plan for their particular business. (Fig. 1)

The foundation of value analysis consists of several general techniques which are fundamental to the success of creating and implementing improvements. (Fig. 2) These general techniques include the promotion of more effective teamwork; the capabilities to recognize and overcome the roadblocks to progress; the direction of analytical effort to specific areas of cost; the increased application of good business judgment to each decision; and finally, the utilization of good human relations in all contacts.

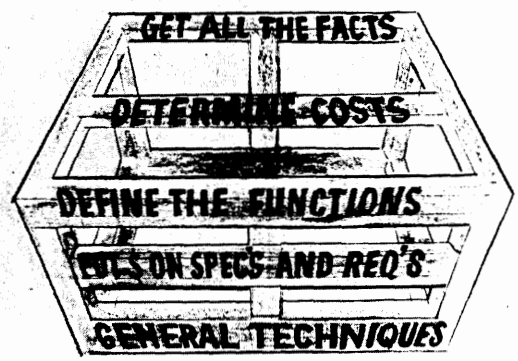

Fig. 3 - Information phase of job plan

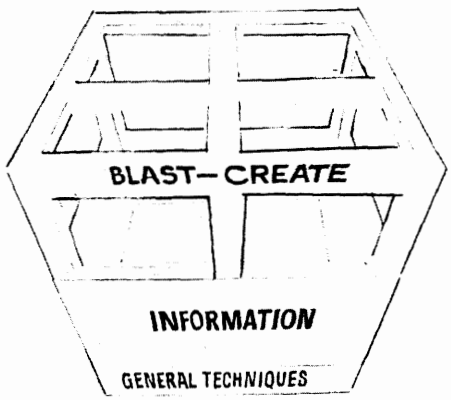

Fig. 4 - Creation phase of job plan

The first floor of the building depicts the information phase of the job plan and includes four fundamental techniques: (Fig. 3)

1. The clear, specific definition of functions which occur in any product. This technique is fundamental to the philosophy of value analysis and must be handled with certain guide lines and approach. More will be said about the definition of functions later.

2. The techniques and ability to determine extensive and factual costs so related to various elements of the hardware and so divided into cost centers as to make value analysis possible.

3. The obtaining of all known facts necessary for initial or improvement decisions which establish the product cost. These facts include all of the engineering, manufacturing and procurement background information.

4. The designation of cost necessary to achieve each desired specification and requirement.

The second floow of the building consists of the creation phase of the job plan. (Fig. 4) This includes the techniques of creative thinking designed to generate large numbers of possible solutions to a particular problem. The blast and create technique concerns the elimination from one's mind of the present hardware or known solutions to the performance

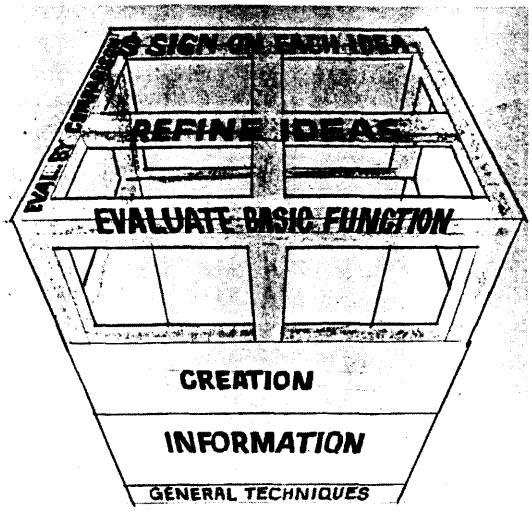

Fig. 5 - Evaluation phase of job plan

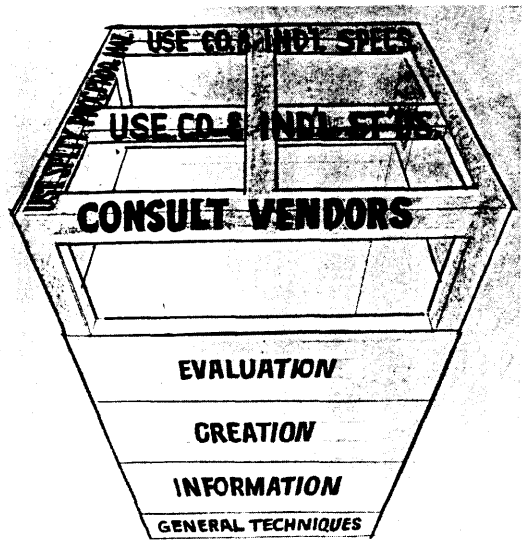

Fig. 6 - Investigation phase of job plan

of required functions, followed by the positive approach creation of new solutions.

The third floow of the building represents the evaluation phase of the job plan. (Fig. 5) This phase of the job plan involves both the evaluation of the worth of required functions and the evaluation of the potential of new items. Specific techniques which contribute to this evaluation include:

1. The evaluation of basic functions by artfully and scientifically assigning monetary values to the functions previously defined in terms of measurable design parameters. This technique is critical and fundamental to the value analysis approach and perhaps the least often applied properly. More will be said about this technique.

2. The technique of evaluating functions by comparison is an adjunct to the evaluate basic function technique. Both of these techniques are designed to create awareness of unnecessary costs and to provide specific guide lines for the achievement of lower cost objectives (better value).

3. Following the creation of ideas, comes the techniques of putting a dollar sign on each idea to evaluate the desirability of developing that idea.

4. Finally, comes a technique of refining ideas which includes the modification and alteration of basic ideas to meet the practical functional requirements of the product. With this base we move into the next phase of the job plan.

The fourth floow of the job plan consists of the investigation phase (Fig. 6) which includes several techniques designed to develop the refined ideas into practical solutions to the problem. Here, we are attempting to develop the design alternates for the purpose of selecting the best or lowest cost approach. The techniques which have proved to be fundamental to this phase of the job plan are:

1. Consultation with specialty suppliers or vendors who represent the best and most up-to-date source of information which will lead to the best value decisions.

2. The effective use, at the appropriate time, of both company and outside industrial specialists. These specialists have a wealth of latest and most complete information concerning all elements of design, manufacture, and procurement which effect product cost.

3. Thorough investigation into the potential use of all specialty processes, products, and materials.

4. Finally, a thorough evaluation regarding potential application and use of both company and industry-wide standards. While these techniques in this phase of the job plan are very simply stated, the ability to effectively seek out, screen, and analyze information is a complex and difficult problem with which many people have had insufficient training and experience.

The generation of the best solution involves a cyclical application of the creation, evaluation, and investigation phases of the job plan. There are certain variations to the words used to define the job plan. However, the fundamental steps or techniques and the basic approach is identical. For instance, the evaluation phase is sometimes called the analytical phase; and the investigation phase includes two phases called the program planning and program execution phases.

Then comes the final enclosure of the building, the roof, the recommendation phase (Fig. 7) which consists of buttoning up the results of the investigation phase into a factual presentation of the proposed improvement or solution which will motivate positive action to implement the change or initiate its incorporation into the design.

With the completion of this building and a brief description of what constitutes its structure, a clearer picture of value analysis is achieved. The building is dedicated to the accomplishment of the desired product performance at vastly lower cost. It is a system or plan which requires the support and understanding of management as well as the universal application by all elements of the industrial team. (Fig. 8) To achieve this universal application of the value analysis

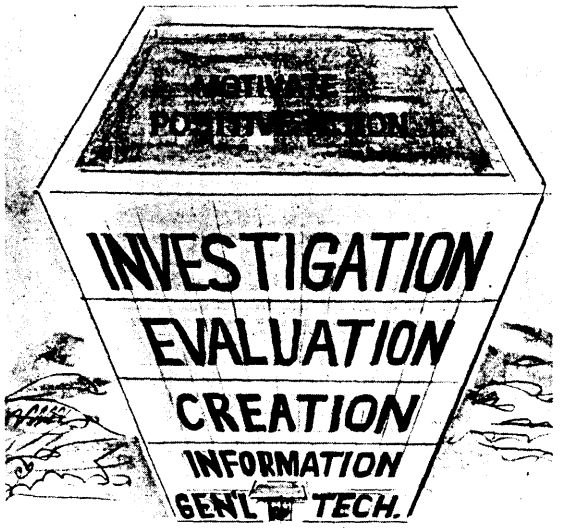

Fig. 7 - Recommendation phase of job plan

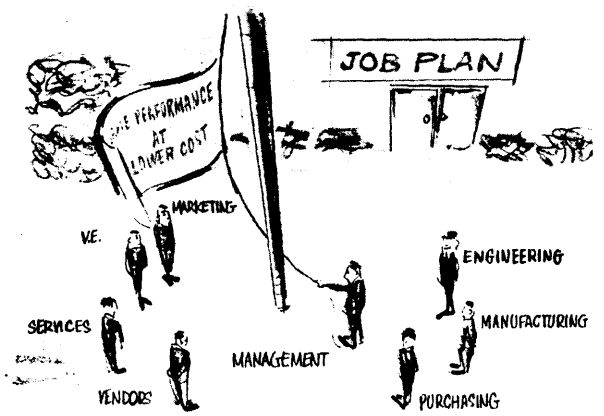

Fig. 8 - Universal application of plan by all elements of industrial team

system usually requires the guidance and leadership of competent value specialists devoting full time to a motivational and educational effort. Now that we have a better picture of the value analysis system, let us look for a minute in more detail at the objectives which the application of this system should achieve. Primarily, these techniques are aimed at helping people to realize that existing products cost too much, or to establish design cost objectives, followed by the increased capabilities to create and develop solutions to accomplish necessary functions reliably for the lowest total cost. To understand and to gain some common language regarding what is meant by the term lowest total cost, we need to look into the field of value. We need to establish a uniform concept of what constitutes product value. The scope and time of this presentation permits only a brief summary in this area. However, it may help to clarify the meaning of the word value and thus achieve a common realization of the objectives of value analysis. First, we should identify the various kinds of value which exists in products. While there are several kinds of value, the most significant of these are grouped into two categories. The first can be designated as "use value," the second as "esteem value." The first is objective and the second subjective in nature. Value is defined as the lowest cost to reliably accomplish function. Function is, in turn, defined as anything that makes the product work or sell. Use values are related to work functions and esteem values are related to sell functions. These points may be illustrated best by some simple examples.

For instance, take a mechanical pencil costing $2.00. The function of this pencil is to "make marks." Here we are defining, in simple terms, a verb and a noun, the basic function of the pencil. This basic function could be achieved by numerous other devices which constitute the various alternate ways to achieve this function, and which would be used to evaluate the worth of the basic function by comparison. One known solution would be a common wooden lead pencil costing approximately 10¢. Thus, we could say that the basic work function would have a 10¢ "use value" level. The remaining $1.90 price for the mechanical pencil would be associated with esteem values such as appearance, convenience, and prestige factors which would have different values to different people and be subjective in nature. Value analysis has been primarily concerned with "use values" and "work functions." However the same system, techniques, and approach could be applied effectively to esteem values and sell functions.

Another simple illustration would be a tie clasp, the function of which is to "hold weight" (represented by the tie). Conventionally, tie clasps are priced from 50¢ to several dollars. However, the use function could be achieved reliably by a standard wire paper clip costing a fraction of a cent. While this represents an artful evaluation of the basic function, it nevertheless serves as a very effective tool to bring into clear focus the true worth of accomplishing any basic function. Scientific means of more accurately assigning monetary values to basic functions are possible, but will not be discussed at this time.

An illustration of how this technique might be applied to product improvement or to product value assurance (before the fact value analysis) would be the accomplishment of the function of holding a cabinet door open. The basic function of "supporting weight" under the specific performance and environmental conditions could be accomplished in a variety of ways. Performance engineering requirements would be achieved with the design and manufacture of a special door stay costing "x" number of dollars. Value engineering would involve the assignment of monetary value levels to achieve this function, and still reliably meet all the performance requirements. Value engineering work runs parallel to performance engineering, helping to select the best design compromise to meet both performance and value objectives. How close the final result came to the basic value level for the function would be determined, in part, by the extent to

which appearance, sales (esteem value) features were added or deemed necessary for marketing or other purposes. These added elements of cost should be carefully analyzed and reduced to a minimum.

These cases and the above discussion illustrate the functional approach of value analysis consisting essentially of defining and evaluating functions and developing alternate solutions to reach the best value based on existing production capabilities and technological knowledge. Because the philosophy of value analysis includes the systematic application of proved techniques to bring about improvements, it accomplishes outstanding results where conventional methods will leave considerable unnecessary cost. One example of the effectiveness of the teamwork application of value analysis philosophy is illustrated by the results achieved on a small magnetron tube. A three-man-week value analysis study led to a 50% reduction in product cost.

An illustration of the type of improvement made is shown by Fig. 9 which illustrates an 85% reduction in the cost of an output flange. These and other improvements were brought about by the organized application of the value analysis system which is most effectively organized as a teamwork activity of all decision making people who have had training in value analysis and who utilize the consultation of a qualified value specialist. The importance of teamwork action using the value analysis approach is illustrated by Fig. 10 showing that out of $11,000 product cost reduction, better than 70% was accomplished through combined or teamwork action.

While there is much more that can be said to specifically create in the minds of people a true picture of value analysis, the above discussion may serve somewhat to clarify the concept and define the value analysis philosophy. It is the

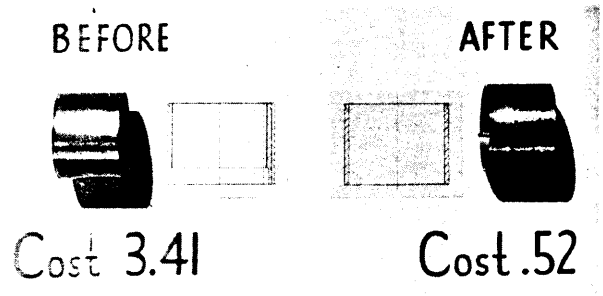

Fig. 9 - Reduction in cost of output flange - savings 85% $2890/m

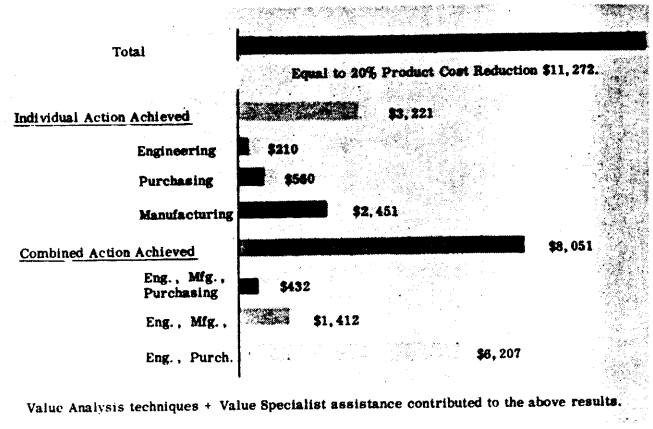

Fig. 10 - Teamwork accomplishes greatest cost reductions

philosophy which is being adopted by progressive business management because they foresee the necessity to meet the demands of a world-wide competition market. The value analysis philosophy can do much to meet this challange.