VALUE ANALYSIS AND ENGINEERING

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by

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QUESTIONS:

Is Value Engineering something in its own right or good design engineering principles?
Relate process service and value engineering.
What is the desired relationship between design engineering and value enginneering?
Should everyone be indoctrinated or is it best done by key people?
Provide examples of "service value analysis" or of "service products".
Is it applicable to management control systems?
Should the program start at the top and work down or start at the bottom and sell up?
At what part in the design cycle should value analysis or engineering start?
How do we develop costs?
How do we sell the sales department on making changes?
In a new organization, should this be introduced by evolution or revolution?
If by evolution...What is a good step-by-step process for introducing it?
How do we weigh intangibles?
How do we divorce cost from product performance?
How are quality levels established?

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VALUE...

Appropriate performance
Appropriate cost

Well-defined technology for measuring and securing appropirate performance.

Various activities contribute to securing lower cost; such as...

Certain design practices
Industrial engineering
Methods and planning
Work simplification
Good buying
Etc.

Value Analysis and Engineering technology--something entirely different--not included in above.

No quality deterioration--suitable for small-lot production or large continuous production-suitable for process or service type expenditures.

Value Analysis and Value Engineering synonymous.

Consist of a new system of techniques for the sole purpose of achieving lower cost.

New system or product always compounded of some known parts or technology plus some new--comparison of automobile and airplane.

Value Analysis technology is totally function-oriented. Starts with functions customer wants and wants to pay for. Two types--"use function" and "esteem function".

Value techniques are search oriented - not knowledge oriented.

Value techniques recognize existence of "roadblocks". Have procedures for identifying them and for dealing with them.

Value technology establishes believable and credible dollar value for function; then avoids expending resources of money, time, and men on solutions which would not be within the framework of acceptable cost.

Some examples resulting from study of function, evaluation of function, and development of alternatives:

Electronic handles	$8.05 - $2.00
Filter circuit	$46 - $6.80
J-bolt supports	11-1/2¢ - 1-1/2¢
Switch blade	$3 - 40¢

Military needs--lowest practical cost at all times to result in more weapons, which are needed, for the same cost.

Competitive merchandise lines—any producer needs costs a little lower than competition.

In competitive business, sales are at market levels. A manufacturer takes his profit--if any--out of his costs.

Much less cost needed on wide range of competitive merchandise--should compete with world.

The Value Analysis system provides a different way of looking at the functions required.

It then provides the thinking which will secure the functions for their value.

The technology is made up of three parts:

The first part entirely new.

The second, parts which have been used before but here receive greater emphasis.

The third, parts from all good technologies which promote the objectives.

A new techniques is...evaluation of function in dollars, whick follows the division of the function into "use" and "esteem".

In this process, value of a function becomes the lowest cost which will reliably provide it.

In this process, each individual function is evaluated separately. If several functions exist for a component or part, they are normally added directly if the functions are not inter acting or by first arranging them in sensible order, then accepting the solution for each function as a part of the problem while evaluating the next function--for those which are inter-acting.

Functions are then further divided into basic and second-degree. The basic function is that for which the customer bought the product; i.e., he bought the refrigerator to keep thefood cold; however, hundreds of lesser functions exist with relation to the various assemblies and parts because of the means chosen to accomplish the basic function.

It is usually found that the va ue of a function in dollars is between one-third and one-fifth of what it is costing.

Military products have not afforded opportunity for the cost-oriented technologies; therefore, experience shows that they can normally be produced for one-third of the cost if they are subjected to an intense value analysis study.

Competitive products show that between one-third and one-half of the cost becomes unnecessary as better solutions are developed for the various product functions.

The problem of securing very much lower cost is one basically of people, not of science. It is estimated to be 75% people problem and 25% science problem.

Psychologists warn that in discussing designs, manufacturing practices, or purchasing work which has been accomplished, we are dealing with the "warm blood" of the individuals who did the work before and not with objective material situations.

Large amounts of unnecessary cost exist for several reasons:

Honest wrong beliefs.
Habits in people, in systems, and in machines.
Lack of information.
Lack of the idea.

To determine appropriate cost, the Value Analysis technique of evaluating functions is provided.

Then, to secure the lower cost, the technology of Value Analysis includes:

Three basic steps

Carefully and precistly identify the function--classify and divide it.
Evaluate the functions separately and the functional groups together.
Cause alternatives to be developed.

A Job Plan, which consists of
- Orientation Phase
- Information Phase
- Speculation Phase
- Analytical Phase
- Program Planning Phase
- Program Execution Phase
- Status Summary and Conclusion

Thirteen Techniques... some of which are
- Avoid generalities--get down to specifics
- Get and understand costs--meaningful costs are as essential to appropriate decisions affecting cost alternatives as meaningful tests are to appropriate decisions affecting performance.
- Give credence only to information from the best source.
- Blast, create, then refine.
- Utilize and pay for vendors' skills and knowledge.
- Utilize specialty processes.

Appropriate cost can be lost in any of the following stages:
- Manufacturing concept.
- Design concept.
- Design detail.
- Manufacturing concept and planning.
- Manufacturing operation.
- Purchasing.

To achieve and assure appropriate costs, the value technology has techniques which bring into focus the areas, be they in any of the above, where actions so far less than the optimum prejudice the case for appropriate cost. The effect is that depth knowledge is brought into use in the needed area and appropriate cost can then be provided to the product or service.

It is apparent that, as the value engineering technology is maturing, it is more and more being used before the fact. Industry and government have long used specialists in any area when it became necessary to secure better results than could be secured by good general people. This is no exception. Now that it is becoming as important to have appropriate costs as to have appropriate performance, engineers, manufacturing people, and others are inviting specialists to bring in their contribution at the right time and to the right extent.

It has been found desirable to provide about one week of value technique training to all engineers and their equivalent in manufacturing and purchasing.

The man who will become a specialist requires periodic training, and periodic opportunity to teach others and to use his techniques throughout a period of a minimum of a year before it could be expected he would have accumulated enough skill to correctly be considered a value consultant.

In the matter of decision making, it is worthy of serious consideration that the basic criterion for decision-making is often that of minimizing the risk of the decision-maker. This statement deserves depth probing and will be found to hold the key to many decisions or perhaps areas where decisions are not forthcoming.

As we scan the questions, we see that most have been answered. However, I will add a commdnt or two on some of them.

Q. Should the work start at the top or the bottom?
A. The lowest man in the business organization who is accountable in measured terms for profit is the president or general manager. The sole purpose of the value technology is to provide profit--or in the military, its counterpart, to provide very much lower-cost production. Therefore, sufficient emphasis for appropriate results is usually not forthcoming unless the man who is vitally involved understands it, wants it and backs it. Often starts are made either from the top or bottom or in the middle, but, until this prpper support is secured, the program can only accomplish a small part of its potential.

Q. Should the program in a new organization be developed by evolution or revolution?
A. Until and unless the profit-accountable manager recognizes that this is a tool of his to secure and assure profit, it must be started and carried out by evolution. In some instances, however, it has been well understood by the appropriate managers right at the start and it at once becomes as much a way of life as engineering or manufacturing or purchasing or selling so that good arrangements, organization, and actions were immediately put into motion.

Q. How are quality levels established?
A. One of the important responsibilities of engineering is the establishment of quality levels. The work of value analysis or value engineering is to maintain precisely these quality levels but provide very much lower cost alternatives for doing so.

Q. How are value engineering and reliability related?
A. In achieving value, appropriate performance and appropriate cost must be secured. Proper reliability is a part of the appropriate performance responsibility and is handled by engineering procedures and practices, while securing proper cost is handled by the technologies of value analysisplus those others previously listed.

All of us may well recognize that in the science of securing appropriate performance, we are well advanced as compared to the art of securing appropriate cost. It is the function of the growing value analysis and value engineering system to provide adequate practical tangible and measurable means for likewise predicting, securing and measuring costs to assure appropriate cost.