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Value Analysis--Foundry Friend or Foe?

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Gentlemen.

Thank you, Matt.

Victor Lindner has reported some very meaningful work. You will find that our nomenclature varies a little. We certainly like the good work which Vic is leading and the objective techniques he is using although, instead of value engineering, we would call some of them good engineering techniques, good industrial engineering approaches, good process engineering, good materials application engineering, etc.

As value analysis training seminars started, we found support in many sales departments, but the opposite was true in the area of foundry sales. Fortunately, our sales manager then came and said, "We are shocked by the number of jobs which were castings when they go into a seminar and are not castings after the seminar. It appears that your activity is injurious to the foundry's future."

Of course, we were grateful that he came to us because, first, the opposition of anyone tends to retard a program and we knew that we did not have support of the foundry people, and second, it gave us an opportunity to communicate accurately to another responsible individual. He agreed to attend two days of a seminar himself and personally study the process of application of the techniques during the various project study periods on specific projects.

At the end of the first day, he came with a bright countenance and said, "You know, I believe I have found four jobs which can be done better with castings than by their present method and I expect we will get the jobs." At the end of the second day, as he saw first-hand the study of function and the framework which builds all decision-making upon the basis of the real functions, both of use and of esteem which the customer wants, he said, "An opportunity to come to a value analysis study group is just like having a 'license to steal'." He continued that he could now see why the foundries were losing jobs. Representatives of other products, other processes, other materials, were studying the current functional needs and, in the environment of constant change, were able to show that their materials best served the function. The opposite was true of the foundries. They had not been represented. Functions which should, due to changed conditions or new foundry practices, be accomplished now by castings never came forth because the foundry knowledge, creativity, and effort were not at the decision-making table. Needless to say, since that time foundry management has been among the strongest of proponents of the value analysis approaches and techniques.

So that you can meet value engineering and deal with it effectively, I expect that you would like me to show rather clearly what I consider the "clear strain" of value analysis is. This means that I will do some "weeding"; i.e.

removing what value analysis is not from the field of general concepts. So, I will ask some precise questions, then answer them.

Is analyzing of bids Value Analysis?	No.
Is questioning the customer on his real functional needs Value Analysis?	No.
Is getting suggestions from suppliers Value Analysis?	No.
Is analyzing a design for labor and material content Value Analysis?	No.
Is studying materials flow in a plant Value Analysis?	No.
Is naming functions in two words Value Analysis?	Yes.
Is dividing function into basic and second-degree Value Analysis?	Yes.
Is assigning appropriate cost, or "value", to a function--i.e., evaluating a function--Value Engineering?	
If arrived at by analysis.....	No.
If arrived at by comparison....	Yes.
Is applying better processes Value Engineering?	No.
Is studying material substitution Value Engineering?	No.
Is associating costs with functions Value Engineering?	Generally Yes.
Does Value Engineering work better on high volume items?	No.
We used to find a good supplier, then deal almost exclusively with him. Now I insist on three bids on everything over $100. Is that Value Analysis?	No, that's purchasing.
Our suggestion system asks for everybody's ideas, keeps them on their toes, keeps them thinking. Is that Value Analysis?	No.
As a purchasing agent--if instead of accepting the best quotation I negotiate with the supplier for better prices, is that Value Analysis?	No.

I'm a salesman. If I sell a standard item instead of causing the factory to make something different, is that Value Analysis? No.

As a salesman--if I stop taking a customer to lunch, is that Value Analysis? No.

If I as a salesman rearrange my time and route so that I call on my customers with less traveling expense and traveling time--is that Value Analysis? No.

If as an engineer I use a new material that makes just as good a product at lower cost, is that Value Engineering? No.

If I design out labor, is that Value Engineering? No.

If I keep all of the utility of the product but eliminate some of the 'gingerbread,' is that Value Engineering? No.

If we are having field failures and I design in some more quality, is that Value Engineering? No.

As a process engineer, if I find a process that reduces costs, still keeps quality, is that Value Analysis? No.

If I study the manufacturing line and find I can rearrange work stations and make the product on one floor instead of two with large savings, is that Value Analysis? No.

If I can improve work flow and reduce overtime, is that Value Analysis? No.

If by better plans with different job rotation or work scheduling, I can reduce idle time in the factory, is that V lue Analysis? No.

If I benefit the company by shipping scarce items first to the customers who need them most, then completing shipments to others, is that Value Analysis? No.

If as a manager I have two engineering departments and can combine into one reducing the payroll--still get the same good results--is that Value Analysis? No.

If as a manager I see men who are not doing their jobs well, hire teachers to teach them and, as a result, increase output substantially, is that Value Analysis? No.

I study and measure the similar work of two groups, then, by causing each to also use the better approaches of the other, I get 25% more results. Is that Value Analysis? No.

Now--we are coming to a common language, you probably ask, "What is left?" "What then is Value Analysis?"

Value Analysis is something which did not exist prior to 1947. It is something that does not duplicate work that did exist; but rather it is work which was needed but not performed.

Value Analysis is a complete system of approaches and techniques for one sole purpose; namely, to efficiently identify unnecessary cost sooner. This it does, as you will see, by providing more clear understanding of the functions to be accomplished, by providing m ore effective search, by accelerating the development of alternatives, and by causing better criteria to be at hand for the decision-maker at the right time.

A few of the techniques deal with the technical factors, as do the techniques of the technologies of engineering, industrial engineering, materials, purchasing, etc. Most of the techniques deal with people factors in relation to the technical factors.

Let us develop it from some examples, all of which will involve castings. All of the examples are production items manufactured as they are because they were believed to be sound economically in comparison with other construction. All had been used two years or more in production before the work we now report.

1 - A flange about 10" in diameter and 5/8" thick was flame cut and machined from steel plate. Its cost in production quantities, after a few years of starting experience, was $12.50 each. It went onto good equipment. All planning was established, the tools were in hand, workmen were trained and it made a good product.

2 - An arc chute was about a foot long and was composed of several fabricated bronze sections brazed together, having a cost of $5.80. Likewise, it performed its task well. It had been cost reduced several times. There were no unknowns in its manufacture or its use. Equipment was in place, people trained, disappointments were non=existent.

3 - On the electric blanket is a small control shaft about an inch long with several diameters and threads made of steel. With its bronze nut it cost 11¢. Of course, with large quantities, significant costs are involved--for example, on the quantity of one million, 11¢ is $110,000.

4 - A switch blade already used a bronze sand casting about the size of the palm of the hand and 1/4" thick. Into this, after milling, was brazed a bronze flattened wire perhaps 1/16" by 1/2" and 5" long. The cost was $3. It performed well, went well through the factory, required no additional supervisory effort and offered no risk of failure.

All of these items had been the result of the normal good processes of engineering, of manufacturing, of cost reduction, etc.

Now let's return and apply a few of the specialized techniques of value analysis to them and see what happens. The techniques will follow about as follows:

1. What are we trying to do?

   More precisely, what are we trying to do?

2. Surround the situation--what we want to do--with more facts.

   Identify the people barriers that stop fact accumulation.

   Deal appropriately with these people barriers so that more information is secured.

3. Have each function clearly identified
   separated
   classified
   grouped
   understood
   evaluated

4. Now, cause the required--already known--technologies to be used.

EXAMPLE #1 - The flange...

What was its purpose?

It had four functions:

To support a 10-lb. safety device.
To facilitate repair or re-setting.
To resist temperature changes of 200 degrees.
To provide the appearance which the customer expected.

After the function study and work was completed, the combined functions were evaluated at 60¢.

The part cost $12.50; was thought to be good value.
By using the value analysis technique of evaluating functions by comparison, the total functions from it were evaluated at 60¢.

Now action ensued. It became an aluminum casting which perfectly accomplished the entire task for $1.50.

EXAMPLE #2 - The arc chute...

Precisely, what were the functions to be accomplished in an arc chute?

Cool the arc.
Conduct and dissipate heat.
Resist concentration of heat and burn-out.
Support a small structure member.
Appear appropriate to the customer.
And one or two others.

One by one these functions were evaluated, arriving at a total of approximately $1.00. Now some of the search techniques were used with the result that a foundry provided a shell molded brass or bronze arc chute at a cost of $1.80.

EXAMPLE #3 - The control shaft and nut...

Responsible managers of engineering and manufacturing knew that the most economical way to make a small complicated part such as the 1" control shaft was on fully automatic screw machine equipment. Here the best of material handling was being used, machine speeds were right, the cutting tools were right, and the parts were made totally automatically with repeated quality item after item. To believe that any other approach could be of such repeated high quality and of lower cost was an idea which would have short life in this experienced industrial group. Nevertheless the functions were studied one by one and evaluated by comparison at 1¢. This rather shocking indicator caused a more clear understanding of exactly what was to be accomplished and under what conditions. The result was that a foundry man provided a small part which took the job. Because stresses were lower, he used flats on the side of the threads and the flash where the molds opened was not troublesome. He also suggested

a small molded nylon nut which was used and performed the good additional function of gripping the shaft holding the control in its existing seating. The total cost dropped from 11¢ to 1-1/2¢. Again, when the foundry was "on hand" with its functional materials and at close range in studies with the functions to be performed, and when this was imaginatively done, the work went to the foundry.

EXAMPLE #4 - The Switch Blade...

The fourth example is somewhat different--it already used a casting.

It arrived at the functional part for $3.

What are we trying to do with this part?

What are its functions? It carries 100 amperes 4".

What is the appropriate cost or value of the function of carrying 100 amperes 4"?

To what would it be compared?

To a piece of wire? That is right, and its cost would be 5-10¢.

It has one more function... it must have a mounting means which is capable of manual opening. This was evaluated by a process which is taught under the name of "evaluate functions approximately". Here knowledgeable men estimated that the length of the material must be extended and perhaps it must be flattened and it must be formed so that function was evaluated at 10-15¢. In other words, the total functions of the $3 device are now, by the use of this value analysis technique, said to have a value of 20¢. Of course, the search techniques were used and resulted in a simple answer but did not use a casting. A pressed brass part totally interchangeable, somewhat smoother and more attractive cost 4¢.

Now let us look back and see what the significant factors in the operation of the techniques were. They may be reviewed as follows:

1. What are we trying to do? More precisely?

   The "function" naming, grouping, dividing, classifying techniques of value analysis help accomplish this.

2. Surround the situation with more facts.

   Take nothing for granted simply because it is stated.

   Various value analysis techniques help accomplish this.

3. Recognize the human attitudes which prevent fact gathering as they appear.

4. Deal with each attitude so that it does not stop fact assembly.

   Various value analysis techniques help accomplish this.

5. Use the best resource available to deal with the human attitude and habit factors that then stop action.

6. Make sure that practical alternatives are clearly before the decision-makers at the proper time.

A more complete and usable definition of value analysis or value engineering may be stated: "Value Analysis is an arrangement of techniques which makes clear the functions the user wants from a product or service; establishes the appropriate cost for each function by comparison; then causes the required knowledge, creativity, and initiative to be used to provide each function for that cost." It is a system of understanding, of approaches, of techniques to accomplish many times the order of magnitude of results--when identification of unnecessary cost is the objective--with any amount of resources or time.

Value Analysis, then, is a system, a complete set of techniques, properly arranged, for the sole purpose of efficiently identifying unnecessary cost, before, during, or after the fact. Some of the techniques are familiar, some modified, some new. The effectiveness in utilizing this system depends upon the understanding, training, and skill of the value engineers, as well as the understanding of all business people in the environment in which it operates.

Value consists of appropriate performance and appropriate costs. Good engineering techniques, measurements, and tests normally are used throughout the performance area. The technology of Value Analysis or Engineering is growing toward a similar degree of measurement, of test, of definiteness in the work of achieving appropriate cost.

Now let us review some results which accruedwhen the value analysis techniques were added to the other good techniques--when a more intense objective study was made of just what functions are to be accomplished, when the functions were evaluated, when the people factors were identified and dealt with so that more information could surround each function, when improved search techniques found best means for accomplishing functions.

KEEP THE JOBS

Fuse Disconnect - Formerly made as a two bronze castings, with necessary machining, drilling and assembly screw and lockwasher. Redesigned into a one-piece casting eliminating machining and assembly.

Cost reduction -- annual -- $7000. Kept work in Foundry.

Louvre - Functional thinking simplified louvre blade. Kept all function. Eliminated expensive core.

Cost reduction -- annual -- $24,000. Kept job in Foundry.

Motor Brush Holder - Formerly produced as a sand cast bronze detail requiring considerable machining including boring two holes and inserting and fastening in place two, 1" dia. steel pins. Die cast bronze part with the steel pins "cast in place".

Cost reduction -- annual -- $5/casting, 10,000 castings per year = $50,000

GET NEW ONES

Bell Mouth Adapter - Machined from 5-1/2 lbs of bar steel. Now investment casting at 1/2 lb.

Cost reduction -- annual -- $35,000.

Coil Bracket - Steel fabrication cost $4. Now, grey iron costs 72¢ ready to use.

Bearing End Shield - Fabrication cost $757.00 a pair. Now as castings, cost $300.00 per pair.

In conclusion, is value analysis foundry friend or foe?

Let us predicate our answer upon one more question..."Are today's designs and customer needs static or ever-changing?" Since they are ever-changing, it can be faithfully said that if the foundries are not on hand learning with new clarity the functions which are to be accomplished as growth and change constantly occurs and presenting their engineering material to perform these use and esteem functions, then value analysis is a foundry foe.

If, however, the foundryman recognizes in his unique material and process means for solving wide varieties of new as well as old customer functions of both use and appearance and if, as a result, the foundry through the value analysis approaches learns more about the user's functional needs, then value analysis is a foundry friend.