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*RESULTS FROM THINKING WILL BE INCREASED BY VALUE ANALYSIS PROCEDURES

Since time began, better ways of achieving desired results in all areas of activity of man, have occasionally come forth. Often the changes have been simple and included little that was new, but were so appropriate that the effectiveness of man's effort was greatly increased. First thoughts were usually, "there's nothing new to that", however, as benefits multiply and show themselves, the next reaction is "Why didn't I think of that?". Finally, as it is seen becoming an accepted way to better achieve the desires of man, this changes to "how do I do it?", "how do I gain constant benefit from it?".

PARTS OF THE WORLD AT THIS MOMENT DIFFER

in Value Analysis procedure understanding. Some parts of the world are in the first stage / Some are moving into the second, some are moving into the third and some are in the third stage of Value Analysis Understanding and belief. No matter what is the present status in this area, it is my purpose to increase knowledge and understanding of the Value Analysis Techniques and Procedures and their use.

IMPROVES ACHIEVEMENTS FROM MENTAL "WORK"

The techniques are step-by-step procedures which achieve greater results in lesser time, from the minds of men, either in groups, or singly, no matter what type of problem they are trying to solve, ^{or} project results they wish to achieve. To improve productivity has been and is a vital program. It usually means to achieve greater output of product per unit of resources consumed. It also can mean greater output of good mental achievement from those whose task it is to "think". The VA procedures increase the productivity of those whose task is to manage, plan, design, develop, organize, research, integrate or control. It is believed that usually three people using the VA procedures will achieve as much good mental results as four using conventional thinking habits and patterns.

While this thinking system was originally developed from the necessity to "think smarter" or go out of business on severely competitive lines of products, it is now bringing improved mental results in all activity which utilize mens minds. Some are: accounting, administration, government groups, social services, hospitals, sales strategy, buying, and more; wherever money is spent for people whose task it is to think.

These procedures make up a problem-solving system which organizes the essential elements of the problem and the diversified capabilities of the brain into one plan ^{and} which promotes prompt effective solutions.

DISCIPLINED BRAIN SEPARATES FOUR TYPES OF THINKING

Mental actions are different in each. Each type of thinking is much more thorough, more effective if the whole brain is used on that one type of thinking at one time. With that type thoroughly done, the disciplined thinker proceeds to the next, and accomplishes it thoroughly, then on to the next.

These four are: Searching, Analyzing, Creating, Judging.

The first two are PROBLEM SETTING, the last two are PROBLEM SOLVING.

However, for superior mental productivity, before starting the problem setting and solving, another action is essential. Call it Mind Tuning.

MIND TUNING IS ESSENTIAL

Even when doing mental work alone, this step increases results. The question is asked, "Exactly what am I trying to do?" Perhaps a dozen or more answers are physically or mentally jotted down. They become very precise, very exact. Sometimes they change the approach. Sometimes they change the project. Often some propel the work toward a suitable solution

When mental work is being done in groups of two or three or more, even greater benefit comes from "Mind Tuning". Each has a somewhat different idea of the job. It's like having a six-horse team hitched to a load with no headstraps on the bridles to keep the horses all pulling the same direction. Questioning must continue, "Exactly What are We Trying To Do?" until the leader and all present agree exactly. Then, and only then, with all minds pulling in the same direction, proceed. This step may take a half hour or it may take a half day. It may result in a different make-up of the group. It may change the problem. Whatever it does is excellent for now the group can proceed using all of the mental-power it contains.

PROBLEM SETTING - SEARCHING FOR INFORMATION

The foundation for effectiveness is built in this Information Thinking and Searching step. What are the facts? What are the truths? What have been thought to be truths? For example, when the problem is to improve either the cost or the performance of a product, questions of the following type will be answered. What is to be accomplished? What is it that the customer really needs or wants? What are the desirable characteristics as to size, weight, durability, etc.? Secure all pertinent information: costs, quantities, vendors, drawings, specifications, planning cards, manufacturing methods data

as well as actual samples of parts and assemblies, where practicable. Examine the basic engineering with the engineer. Ask questions, listen, and develop through him, a thorough understanding of the experience with the product to date. Examine the basic manufacturing with the manufacturing experts. Ask questions, listen and study the manufacturing methods.

Carefully separate facts from assumptions. Review each. Determine if facts can be substituted for parts of assumptions. Seriously question assumptions of long standing. In the case of new products, secure all information which is available: all design concepts, preliminary design sketches, preliminary cost estimates, etc. Group the facts. Group the assumptions. List the information not known but needed. In this step allow no interpretation, or analysis or idea generation. Use the full minds to develop knowledge. What is known? What is believed? What is done? Where? By Whom? When? At what cost? What are the service factors? What are the maintenance factors? What are other customer factors? Why was it done this way? When? What changes? Why changed? Why not other changes?

Surround the situation with more facts than one person has yet viewed in one picture. This work may be done by individuals, or by groups of any number of persons, providing each person present has some information or

knowledge or assumptions used, and further, that the leader manages the meeting so that there is deep "dredging" for pertinent information, with positively no wandering half-thoughts of analysis or possible solutions.

PROBLEM SETTING - ANALYZING THE INFORMATION

Now, all minds are "shifted" to analysis thinking. What are the meanings? What are the main problems? What are the sub-problems? ~~What are the~~
~~first problems to be solved?~~ In this step there is extensive
function study. Functions are separated and/or grouped. The Function Analysis
System Technique sheds enormous light on opportunities for benefit. Functions
 are divided as to basic or second degree, as to USE, or AESTHETIC, are evaluated in dollars etc. (Several days of study and experience in the Value
 and Engineering
 Analysis function study techniques greatly increase competence in this step
 of mental work). What are the reasonable goals and plans? What are the
 key problems to be solved first? What solutions seem reasonable, from the
 information gathered? What steps - first, second, third etc. - are indicated
 What additional information is required? What unlisted assumptions are being
 made? Are the assumptions now ³ valid? What solutions does it make sense
 to search for? Approximately what savings or benefits might each of the
 best approaches bring? Exactly what parts of the problem, or what overall

problems shall we seek better solutions for, first? What specific needs, when well met by better solutions, would "unlock" very beneficial solutions for the project?

In Analysis type thinking, two people are the optimum number unless the third has special technologies that are constantly needed and the mental skills required to "pull" in mental harmony with the other two at each instant of their joint work. Others should be called into consultation as required. In order to draw large benefit from the type of mental work now to follow, named "Creativity", the correct problem must have been based upon all available knowledge, superior function study, and meaningful analysis, which have resulted in exactly the right problem, stated exactly in the right words, often starting with "How might we?" Now the Problem Setting is ended.

~~PROBLEM SOLVING X CREATING X TYPE X THINKING~~

PROBLEM "SETTING" NOW COMPLETE - EXAMPLE

"The plant engineer of a cement plant received instruction from company headquarters to put a dust collector on top of a group of 6 silos. He, with two associates, started the design, preparing to secure bids, buy it and have it installed. Preliminary figures showed that it would cost about \$40,000.00".

Engineering management at that moment, by accident, appeared on the scene and said, "We have a consultant here for today who believes his Disciplined Thinking System might help our operation, let's select any one of your problems and see how it works". They selected the above program.

The discussion went about as follows.

"Our first step ~~in problem~~ is mind tuning", "Exactly what are you trying to do"?

The reply was, "We dont need that, we know exactly what we are trying to do".

"What is it that you are trying to do?"

"Economically and efficiently design, buy, and have installed, a dust collector, as we are told to do, by the home office".

Then followed 45 minutes of hard questioning and thinking, mostly in answer to a repitition of the question "Exactly What Are We Trying To Do?".

"WHAT WE ARE TRYING TO DO" CHANGED

The new task was worded, "Assist in operating a competitive profitable business by minimizing or ending dust".

Then followed "Information Gathering" for two hours. ~~XXXXXXXXXXXXXXXXXXXX~~

These men ran the cement plant and basically knew all of the "ins and outs" of it, so lots of very pertinent information was brought to the surface.

A few items which were quite pertinent, are:

There was not always dust
 There was dust when a silo ran over
 There was dust when the very bottom cement was being taken from the silo
 Cement flow is caused by 30 lb. air infusion at silo base
 There was dust when the 150 lb. air pressure line was used instead of the 30 lb., to cause cement to flow
 The 150 lb. line was often used when the 30lb. line was not functioning
 Between the compressor and the silos was a low place where the 30lb. line went under the road. Too frequently water, rust and other contamination collected there, clogging it
 Dust drops out of a stream of air whenever the cross section of the duct is increased (therefore velocity decreases)
 Some of the silos were always partly empty
 While the exact formulation of the cement in various silos often differed, differences were so slight that dust from any one would not contaminate any other
 It costs \$1,000. per year to clean up around the silos.
 Another \$1,000. per year of cement is wasted.

Probably 10 times this much information was developed. However, these listed here are useful information "bits".

IN THE EXAMPLE - NEXT IS "PROBLEM SETTING - ANALYSIS THINKING"

What does the information mean? What does it tell us? What are the important parts of the problem? Now, exactly what problem or problems shall we solve? ~~XXXXXXXXXXXX~~ We must safeguard against jumping quickly to half-solutions, just because they are "obvious and easy now". What are the problems ~~XXXXXXXXXXXX~~ stated in terms which will encourage creativity?

1. How might we prevent the clogging up of the 30# pressure air line?
2. How might we make it impossible for a truck loader to get ahold of an 150# line?
3. How might we end over filling silos?
4. How might we reduce the small amount of dust which blows up right at the end when the silo is nearly empty and shouldn't have the full 30# pressure?
5. How might we end the small amount of dust which might happen even after the above listed problems are properly solved?

Finally, since the cost of the wasted cement and the cleanup expense total \$2000. per year, and since it is economically highly desirable to secure the return of an investment in two years, solutions to the problems should be created for not more than \$4,000.

Problem Solving of this example will be picked up later after the
~~ENBYKEX~~ discussion of Problem Solving which follows.

PROBLEM SOLVING - CREATIVE THINKING

Creative Thinking is well documented in its own field. Books are written on it. Universities teach it. Properly used, its yield is tremendous and its benefits are absolutely essential. It is now used to find diverse new approaches to the exact problem statements set forth in the Analysis stage.

Basically, ~~XXXXXXXXXXXX~~

It is useful to consider the human mind as containing certain knowledge *bits*, or pieces, and an ability to bring these diverse knowledge bits, which have never before appeared in the "same mental picture," together into one focus long enough to consider "What benefits on my present project might result if I combined them in the solution?" In this concept good useful creativity is maximized if the individual is in possession of two factors: (1) the knowledge bits required to deal with the task at hand and (2) the mental ability to readily join diverse, unrelated bits of knowledge into one temporary picture.

To meet real-life situations, the strategy of value engineering must: ^{analysis}

- a. Provide logic.
- b. Communicate emotionally in credible terms.
- c. Identify new types of knowledge needed.
- d. Provide research techniques that will find that knowledge efficiently.
- e. Cause creativity that will usefully combine the knowledge from diverse sources.

To achieve maximum results in Creative Thinking, three to ten people are optimum. Defer all Judgement Thinking. This will be much more difficult than expected. Use various methods to accelerate the release of creative ideas from the mind. Since Creativity is joining bits of knowledge in new combinations, it is desirable to include people who have some knowledge related to the subject, however, they must accept the discipline of deferred judgement, or they must not be there.

PROBLEM SOLVING - JUDGING

The real essence of judging is, 1. thinking deeply at least for a few moments of the unusual benefits which might be suggested by each approach,
 2. selecting one or two approaches which, when approved and developed, would meet or exceed present need, 3. maximizing the advantages of that approach,
 4. minimizing the disadvantages of the approach. Best results are secured by one or not more than two people, provided the two are an in harmony team thinking pair, calling others into special discussions as needed.

Everyone likes to judge. The task here is to restrict judging to a few minds who are informed, deep, thorough and creative enough to see the opportunity to strengthen good approaches, rather than to discard them in their present form. Development planning to at once move toward use of the new approaches is usually well started by the same persons who effectively judge the approaches.

That's the BIG 4 separate types of thinking used one at a time in ^{Superior} ~~super~~ problem setting and solving in the VA system, preceded by "Mind Sett." and followed by Development Planning.

PROBLEM SOLVING NOW COMPLETE - CONCLUSION OF EXAMPLE - CREATING

Ten to twenty approaches were listed for each of the 5 questions which were set up in the Analysis thinking. They were taken one at a time in the order listed. Each was finished before the other was started. Creativity could have been more extensive, but for the short time available, and the coverage of the items which, by the information and the analytical thinking had been made quite concise, this amount seemed adequate. To conserve space, the listed ideas are here omitted. Only the few selected in Judgement thinking will appear.

CONCLUSION OF EXAMPLE - JUDGING

Judging done at this time in the group was relatively short for two reasons. 1. Because of separating each problem into its own parameters, and of the amount of thinking which had been accumulated on each, good approaches were quite evident. 2. Judging is not best done in a group with outsider people present, but by one or two, in deep undisturbed concentration. Some results of Judging follow.

1. Run the 30# line high overhead where it crosses the road.
2. Move the 150# line so that in no case would it reach the silos without special gear.

3. Some useful steps were selected, to minimize or stop overfilling silos.
4. Some ideas concerning the location and number and type of air nozzles around in the silo base were discussed for further investigation.
5. A simple duct system which would connect the ~~the~~ ~~the~~ essential ventilation opening ³ each silo must have at or near the top, would be put in across the top of the group of Silos at a cost of about \$2,000.

Costs for all of the above improvements would be under \$4000.

CONCLUSION OF EXAMPLE - RESULTS

Time of the group in this VA organized study:

Mind Setting	45 minutes
Information "Thinking"	2 hours
Analysis Thinking	30 minutes
Creative Thinking	30 minutes
Judgement Thinking	30 minutes

~~CONCLUSION OF EXAMPLE - RESULTS~~

4½ hours of use Value Analysis Disciplined Thinking System by three of the plant management team had changed the need for spending to meet ecological requirements from \$40,000. to \$4,000.

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The learner of VA techniques and procedures will learn dozens of supportive approaches which will assist him in achieving results of this or

WHY IS VALUE ANALYSIS DISCIPLINED THINKING SO USEFUL ?

It meets the needs and conditions of people. Its intense study of facts, and of function; its timely and objective analysis; and its provision of essential creativity do much to cope with the totally normal, ever present characteristics of all people in all situations. Some controlling characteristics are here listed.

1. People are more comfortable in all areas of activity and decision, to go where their habits take them.
2. Attitudes develop from experiences (the past) and heavily influence, often control both thinking and decisions.
3. Wrong information, or partial information/^{causes} un-optimum decisions.
4. All persons have some wrong beliefs. Beliefs control decisions.
5. Habits, attitudes and beliefs become channeled by past successes, influencing and often controlling decisions on present matters.
6. Similarly they become scarred (scar tissue) by past failures limiting flexibility and objectivity.
7. All of these and others introduce roadblocks to free thinking and flexible decision making, which must be seen for what they are to allow best decisions.

SOME ACHIEVEMENTS TO DATE

We know that value analysis has made unprofitable products profitable. We know it has turned around businesses. We know it has simplified designs. We know it has improved manufacturing. We know it has gotten new sales. We know it has safeguarded old businesses from competition. We know it has given men new abilities and allowed certain men to "take off." We know it has simplified maintenance. We know it has provided better weapons. We know it

has improved management practices. We know it has improved services.

TECHNIQUES CHANGE A GOOD PERSON INTO A CHAMPION

People.

Perhaps ^{my} ~~the~~ greatest thrills ^{come} ~~are~~ from seeing the almost miraculous growth and development in ~~men~~ ^{people}. Close to a thousand have told me that it doubled their ability. One young man came for three weeks of training. He was age 23. He worked in Industrial Engineering in the factory. He had no formal education beyond high school. He had taken the short courses that were available in the factory in Industrial Engineering subjects.

He was one of a thinking team of three as he learned our techniques. Occasionally I walked by their table. The results they were getting were astounding. He was the youngest and least experienced, but his thinking was clearly leading the group. He was excited by the progress they could make. It was as though, now, for the first time, he had wings and could fly.

I called his manager in the factory saying, "He has ability to help you much more than is possible as you now use him. Give him twice the responsibility now, when he returns. If you don't, you will lose him, and he's superior". He said, "Larry, I appreciate your call, I'll do what I can, but I can't advance him much. He has no technical degree, and others who do have, want and expect the advancements".

What happened? I checked a year later. He had left the company, was manager of Industrial Engineering for a competing company. And what about 5 years later? The Chairman of his board of directors called me, saying, "We have just made Jim our company president".

I wrote him, congratulating him, and mostly in jest, asked, "How much do you think learning Value Analysis increased your competence" He answered, "500%" ! It had given him the wings that he needed, now he could "fly"! He was a winner, now ~~he is~~ a champion.

he is

USE OF TECHNIQUES GOES FORWARD WITH SIX GREAT ~~BENEFITS~~ THRUSTS

1. Less non-contributing, unnecessary cost in all areas of human endeavor, including systems, services, products, government groups.
2. More, better and more appropriate performance per unit of resources used. Resources include peoples minds, their labor, their skill, and materials, fuels, energy etc.
3. Better and more appropriate management and administrative practices and decisions.
4. Great benefits in the construction industry. Equally attractive, much more appropriate architecture, excavations, foundations, structures of all kinds, built in less time, at much lower cost.
5. Great benefits in the procurement and purchasing profession. Buyers will more nearly locate and buy exactly what is needed, and at lower costs.
6. As people learn the amount of increase in the competence of individuals when they have learned and use this thinking system, much more good training will become available. This will increase benefits in all five of the preceding areas.

CONCLUSION

Meeting competition and slowing inflation are the top twin needs in today's economic picture. ^{Happily!} ~~Hapily~~ the large increases in mental productivity which come with the use of the Value Analysis procedures strike directly at improving competitive competence, and slowing inflation.

The people of your great country have always achieved greatness through precision of thinking, invention, development of skills and diligence. Take an example. The Mercedes-Benz diesel. I've driven them exclusively for ten years, so it's got to be the world's greatest car! You have shown your interest by inviting me. You will continue by learning much more and by developing skill in the use of the procedures. Begin using them now. As you learn more of the system you will achieve even greater results on the most difficult tasks.

Good people abound. They want to do good thinking and good work, to develop good skills, to compete successfully and to have a good life as a result. These are the goals of our human growth system of Value Analysis techniques.

Value Car

Lawrence D (Larry) Miles
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* Some of the material is from TECHNIQUES OF VALUE ANALYSIS AND ENGINEERING 2nd edition 1972, Miles, McGraw-Hill Book Co. New York USA, Dusseldorf, Ge.