Value Engineering and Value Analysis efforts have been in being at the Vought Corporation, Systems Division, (Dallas, Texas) since 1957. We have a full-time Value Engineering effort in Engineering, Value Analysis in Material and the overall division effort reporting directly to the Vice President - Administration. It is an in-depth program that generates results. We are satisfied, but not complacent. No matter how satisfied one may be with the past, there is always room for planned betterment to meet the challenge of the future.

With this thought in mind, we took action to make changes in the workshop training effort with emphasis geared to after-workshop use of the functional approach.

C. P. Smith (my manager) is immediate past National President of the Society of American Value Engineers (SAVE) and Manager of Cost Reduction and Motivation at VSD; Hal W. Morrow (a fellow worker), current SAVE Vice President - Finance, and I use function oriented value thinking in our day-to-day activity. We have a total of over 35 years' experience in full-time value work. On a few special studies we follow, in written detail, the Job Plan. Yet, most of our success has been based on a mental exercise with little or no visual evidence that the function approach was used. Typically, we get the facts, define the functions, apply creative thinking, analyze alternatives and implement changes. We mentally follow the value Job Plan.

This mental exercise is necessary in many instances due to "crash" efforts, lack of time, workload, and other factors that creep into the normal work day. But, we reasoned, should this become the rule rather than the exception? Also, what were other seasoned Value Engineers doing? Were they, as a rule, going the mental gymnastic route? We did two primary things to find out. First, this question was posed at a regular monthly meeting of the Dallas/Fort Worth SAVE Chapter. The majority of the practicing VEs in attendance indicated they followed the mental route in most of their value decisions. Typically, we get the facts, define the functions, apply creative thinking, analyze alternatives and implement changes. We mentally follow the value Job Plan.

THE SURVEY QUESTIONS

The survey was designed to obtain data in the following major areas:

1. Mental vs. Detail Application of the VE Approach
2. Use of FAST (Function Analysis System Technique)
3. Matrix Use in Analysis
4. Completion Workbooks (VE Workshops)

The Survey Sheets (Exhibit #1) were distributed at the National Board Meeting held on September 19 and 20, 1975. A personal follow-up was made in October. All Board members responded. The results follow:

THE SURVEY SUMMARY

1. IN DAY-TO-DAY VALUE WORK:
   - Job Plan followed in detail 16%
   - Steps followed mentally 84%

2. FAST IS USED IN:
   - Workshops Yes = 47% No = 40%
   - No Workshops = 13%
   - On-the-Job Yes = 80% No = 20%

3. SINCE WORKSHOP TRAINING, THE JOB PLAN is followed Step-by-Step:
   - All Jobs = 7%
   - 3/4 of Jobs = 7%
   - 1/2 to 1/4 = 40%
   - 1/10 = 40%
   - 0 = 6%

4. PARTICIPATED IN AN ALL PAPERWORK OR SOFTWARE WORKSHOP
   - Yes = 73%
   - No = 27%

4A. PARTICIPATED IN AN "ALL COMPUTER" WORKSHOP
   - Yes = 20%
   - No = 80%

5. A MATRIX IS USED IN THE ANALYSIS PHASE OF WORKSHOPS:
   - Yes = 73%
   - No = 27%

6. THE HEART OF VALUE DISCIPLINE IS THE FUNCTION APPROACH
   - Agree 100%

7. FOLLOW-UP IS MADE TO DETERMINE IF WORKSHOP GRADS APPLY VE FUNCTION THINKING IN DAILY DECISIONS.

184
Writen completions reports prepared on each workshop project

8.  
Yes = 60%  
Sometimes = 20%  
No = 20%

9.  
A workbook is used in workshops

9A.  
Yes = 86%  
No Answer = 7%  
No = 7%

9A.  
Workbook is used as completion report

Yes = 38%  
No = 62%

Survey analysis and general conclusions

How we do VE (Questions #1 and #3)

Some value decisions have to be made immediately in the real environment of our daily work. There is no time for a detail analysis or a written step-by-step Job Plan approach. Too, one major objective of workshop training is to generate this value function thinking in workshop trained employees. But we are the professionals, and over 80% of the time we mentally apply VE. Are we flying by the seat of our pants too much? It is possible we are. Too much of this and we could well drift back into the intuitive or gut feel method of problem solving to enhance value. Also, what does this do to our image in the eyes of our fellow-workers and our management?

An analogy with learning to drive an automobile may or may not apply. Let's take a look. When we are learning to drive we pay strict attention to everything we do. We practice safe driving, observe all road signs and stay well within the speed limits. With experience, driving becomes easy and automatic. However, most of us do not concentrate as much; we let our minds wander. We hedge on stop signs and speed limits. We get involved in accidents or get traffic tickets. Our driving problems become even more magnified if we are on unfamiliar routes or if we change from automatic shift to manual shift or, say, to a 2-axle truck or tractor-trailer unit. We can't cope with these situations because there are different problems involved. So is it with Value Analysis. Each value study has a "different" problem to solve. We are always on a different route. The step-by-step approach we learned still works, but we must concentrate to get the end functional result. One means of assuring concentration is to write things down; to follow the written Job Plan approach.

Alex Osborn in discussing brainstorming in his book, Applied Imagination, states: "The only strictly formal feature should be a written record of all ideas suggested." Further, his group brainstorming methodology specifically calls for a person to take notes. In discussing devices to help idea production, he includes these words: "Another simple but effective way to induce imaginative effort is to make notes. For the purpose of moving our minds, pencils can serve as crowbars."

Conclusion: In more than 20% of the time, we need to apply a written approach that shows the systematic Job Plan technique was used in our decision making. Also, we may just do a better job. (Purpose of Question #3 was to strengthen #1.)

Use of FAST (Question #2)

FAST is one of the newest techniques developed in the VE/VA discipline. Its many and varied applications are reflected in survey item #2. Over 50% use FAST in workshops and approximately 60% in day-to-day value work. Conclusion: FAST is a value technique that is in widespread use in training and the work-a-day world; it evidently aids in our problem solving and in the pursuit of value. Also, it visualizes some of our key value work.

Paperwork and Computer Workshops (Questions #4 and #4A)

Value techniques are being used more and more in paperwork and software applications. Survey results indicate that over two-thirds of us have participated in workshops where all projects were paperwork or software. Very limited use, less than 25%, is being made of the value techniques to stem the rising cost of computer operations.

Use of analysis matrix (Question #5)

Some type of matrix is being used by over 70% of us to analyze alternatives. At least, this is the situation relative to workshops.

Function (Question #6)

The FUNCTION approach is the unique distinction of the value discipline. This question was specifically asked because we, as a Society, have been unable to date to arrive at an acceptable glossary of definitions. Projecting this sample survey to the total membership, we now have one item that we all can agree on 100%. It is a start.

Follow-up (Question #7)

Overall, we do a respectable job to see if our workshop graduates apply the principles in their daily decision. We score 80% on this survey item.

Use of workbooks (Questions #8 and #9)

Lastly, over three-fourths of us use a workbook during our workshops and also, require a completion report. Yet only about one-third let the workbook serve as the completion report. I arrive at the conclusion that we see the value of written (visual) documentation initially, but get away from this as we get more experience. Also, we should strive to let the workbook serve the completion report function.

A picture is worth...

We can make use of the axiom that "a picture is worth more than a thousand words." It takes more words to effectively convince our management and fellow-workers. But if we go the mental route to value, we have only words 80% of the time. Results show we have been successful in our past applications of the value techniques. But could this success have been even greater? "What if" we had had more visual evidence to support our
step-by-step creative problem-solving approach? Would our discussions and presentations have been more orderly, factual and business-like? And what about our credibility? One thing is certain; we would have written documentation in the event we had to justify our decision at a later date.

All of us have probably heard the following statement: "We do value engineering but we just don’t call it that." When the evidence and facts don’t support this statement, we are non-believers. Does our predominately mental approach - with very little to back up our decisions - cast a shadow on our own VA efforts? One thing for sure, it fosters an "art" approach to Value Engineering, not a science or technology professional approach for which we strive.

I believe when we are presenting results, we should also be selling the VA concept. Visualization aids in selling. The following information supports the reasoning behind using visualization of our efforts:

HOW WE LEARN:

1% thru Taste
1 1/2% thru Touch
3 1/2% thru Smell
11% thru Hearing
83% thru Sight

PRESENTATION METHODS:

METHOD RECALL RECALL
Telling it Alone 3 hrs 3 days
Showing-Used Alone 25% 10%
Blend-Tell and Show 85% 65%

A picture is worth a thousand words because people are "visual minded." Why? Because most of what we hear goes in one ear and out the other without being processed, absorbed, or understood. We are not good listeners, as a general rule. Visualization, plus our word message, will enhance the communication of value messages.

RESULTS . . . . WHAT WE ARE DOING

The survey confirmed our own experience. It gave us added vision and broadened our base for decision-making. As a result, we have implemented the following actions.

To motivate all personnel by making it easier, more convenient, and to encourage after-workshop use of the value discipline, we have developed and are using several new techniques and methods. As a secondary function, these were designed to "visualize" the efforts. These aids are brought together in an ACTION AIDS PACKET that has been issued to each graduate of the VA Workshops. These AIDS are:

VALUE WORK SHEET:

To encourage Value Analysis usage by the workshop grads and practicing Value Analysts, a summarized Value Work Sheet (Exhibit #2) has been designed and issued. It summarizes the step-by-step approach into the classic Six Questions: What Is It?; What Does It Do?; What Does It Cost?; What Is It Worth?; What Else Will Do The Job?; and What Does That Cost? An Action Plan block is also included.

We will continue to use the mental approach to value in some of our day-to-day decisions. We’ll encourage the workshop grads to do the same. We must "think value." However, we are getting away from the over 80% category by making it more convenient to follow a written approach. Our goal is 50%.

FAST AIDS:

A supply of 1" x 2" FAST cards for function listing and arrangement have been designed and are in use.

As shown on Exhibit #3, we issued 8½" x 11" and 11" x 17" FAST diagram format sheets with function blocks imprinted in light blue, non-reproducible, lined-up. The purpose is to make it as convenient as possible to prepare rough FAST diagrams. Also, it aids the typist in the event typed diagrams are required. For the benefit of the user, brief FAST logic rules are imprinted on the sheets. When the sheets are reproduced, the filled-in function blocks, title, how/why indications, logic data, and date/study number data are visible.

17" x 22" FAST diagram formats have been prepared. These are similar to the above but for a different use. The blocks are designed to accept the 1" x 2" FAST cards noted above. The two main purposes of these sheets are workshop use in the Team’s final presentation and for use in day-to-day FAST diagramming.

GRAPHIC MATRIX:

For the analysis of ideas, a supply of Graphic Matrix forms, Exhibit #4, is included. These are similar to the above but for a different use. The blocks are designed to accept the 1" x 2" FAST cards noted above. The two main purposes of these sheets are workshop use in the Team’s final presentation and for use in day-to-day FAST diagramming.

SPEAKERS BUREAU:

A mini-speaker’s bureau, composed of the workshop staff, has been offered to the workshop grads and their departments. A matrix, showing speakers and subjects, is furnished for reference information. In addition, the films used in the workshop are made available.

A VALUE NEWS newsletter has been originated to maintain communication, cross-feed ideas, recognize personnel, and highlight specific actions. It is issued on a periodic basis to workshop grads and the cost reduction representatives. Our workbook has been redesigned to perform the added function of serving as the completion report. A part of the Workbook is a one-page summary of the workshop project results.
In summary, the Survey results confirmed our belief that the vast majority of day-to-day value decisions are mental exercises. Again, we don't advocate that this be stopped. It is good, but we are making a diligent and planned effort to bring the mental exercise and written exercise more in balance with each other. At the same time, by making it easier and more convenient, we are confident that this increased visualization of all our efforts will enhance our overall value function and serve as an additional vehicle to foster the use of Value Engineering and Value Analysis.

References:

(1) "How to Prepare and Deliver Effective Oral Presentations," by Clay Hardesty - Industrial Education Institute.

(2) "The Art of Listening," by Jud Morris - Industrial Education Institute.

**QUESTIONNAIRE**

**EXHIBIT #1**

1. IN DAY TO DAY VALUE WORK DO YOU:
   - Follow detail Job Plan? %
   - Mentally Follow Steps? %
     (Yes or No; show %, if applicable)

2. DO YOU USE FAST IN:
   - Workshops? Yes No
   - On-the-Job? Yes No

3. HOW OFTEN, SINCE YOUR WORKSHOP TRAINING, DO YOU FOLLOW THE JOB PLAN STEP-BY-STEP (like in the training workshop)? Check one.
   - All Jobs
   - 75% (of Jobs)
   - 50% (of Jobs)

4. HAVE YOU EVER CONDUCTED (OR PARTICIPATED IN) A VE WORKSHOP USING ONLY PAPERWORK OR SOFTWARE AS PROJECTS?
   - Yes No
   - AN "ALL COMPUTER" ORIENTED WORKSHOP?
     Yes No

5. IN THE WORKSHOP, DO YOU USE A MATRIX TO DETERMINE THE BEST IDEAS TO PURSUE (Analysis/Judicial Phase)?
   - Yes No

   - Agree
   - Disagree

7. DO YOU FOLLOW-UP TO DETERMINE IF THE WORKSHOP GRADS ACTUALLY APPLY VE (function) THINKING IN THEIR DAILY DECISIONS?
   - Yes % (if sometime %)
   - No

8. IS A WRITTEN COMPLETION REPORT PREPARED ON EACH WORKSHOP PROJECT?
   - Yes No

9. DO YOU USE A WORKBOOK IN THE WORKSHOP?
   - Yes No
   - IF YES, DO YOU USE THIS AS THE COMPLETION REPORT?
     - Yes No

NAME (Optional)
EXHIBIT 4-2

FUNCTION ANALYSIS SYSTEM TECHNIQUE

NOTE

Blocks are non-reproducible. Blue Guidelines only.
Only those used in diagramming show when copies are reproduced.

FAST LOGIC

HOW DO I OBTAIN (NAME)? READ LEFT TO RIGHT - ANSWER TO RIGHT
WHY DO I (NAME)? READ RIGHT TO LEFT - ANSWER TO LEFT

A VISUAL DISPLAY OF FUNCTION RELATIONSHIP

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EVALUATION OF ALTERNATIVES

GRAPHIC MATRIX

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