ORGANIZATION AND RESULTS OF A VALUE WORKSHOP

American Society for Metals
Value Engineering Seminar

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Organization of Workshop

The general objectives of the Workshop were two-fold... first, to obtain a number of practical new ideas for our Cost Improvement Program; and, second, to train a number of people in the use of the Value Analysis techniques. Twenty-four projects were picked for the workshop, and models, together with the pertinent costs of all parts, were assembled. Four general types of projects were selected:

1 - "Unlimited", which allowed the men assigned to the project full freedom in looking at the basic design or the processes involved in making the assembly;

2 - "Limited Mainly to Present Design", where minor design changes and all process changes could be considered;

3 - "Quality Improvement", where a more functional design was needed purely to satisfy a quality improvement objective; and

4 - "Evaluate Existing Ideas", where Engineering or Manufacturing thought a project was good but had not been able to evaluate it fully enough to take action.

In order to assure action on any good ideas which were developed, all projects were obtained from design engineers who wanted functional and creative studies made. They would welcome improvements to their design.

Three attendees were carefully assigned to each project, at least one of whom regularly followed the design or manufacture of the assembly. This assured continued interest in getting the new designs into production following the workshop period. Eight leaders with backgrounds in value analysis work were carefully chosen to assist the groups of three attendees with their projects. Each leader was assigned three projects (tables). The make-up of the men working on the projects was as follows:
34 foremen
13 planners
10 engineers
  5 wage rate analysts
  4 general foremen
  2 advance manufacturing engineers
  2 planning supervisors
  1 buyer
  1 cost reduction specialist
  1 inspection foreman
  1 service parts specialist
  1 tool specialist

In addition, two men supplied the necessary facilities and one served as workshop manager.

In order to keep the projects progressing along useful paths, the design engineers responsible for the various projects worked approximately one hour per day in the workshop as a member of the project team. They were careful to remain open-minded and yet were able to supply the answers to questions on performance or specifications which had to be met.

The physical facilities were set up in a private area made by screening off part of the cafeteria. Necessary equipment was supplied; for example, a PA system, a low stage, table for vendors displays, duplicating equipment, a paper work system for vendor contacts, value proposals, sketches, and project documentation books (to be used after the workshop in carrying projects into projection).

The necessary Value Analysis techniques were taught. We used our own value component, company value staff personnel, and value analysis people from various General Electric departments. A professor from Syracuse University provided an excellent program on the subject of "Persuasion." These outside instructors gave the necessary continuous stimulation and motivation to the attendees -- a very important factor. The workshop was held for three weeks from 8:15 to 11:30 each morning with instructions during the first hour and project work following.

Immediate Results of the Workshop

The ideas generated in the Workshop proved immediately that the original objectives were well on the way to attainment. Analysis of the type of ideas revealed three categories:

1 - Completely new ideas or processes to be applied to our designs or production facilities.

2 - Ideas were regenerated which had been thought of previously by the design engineers.
3 - Partially new ideas, actually combinations of new and old ideas which were used as a foundation for new thinking.

At the conclusion of the Workshop the design engineers were asked to reduce the number of ideas which were generated to those which they felt were definitely practical and should have further action taken.

In summary, twelve ideas were listed as old ideas and fifty-one were recognized as new ideas. Thus a total of sixty-three projects were recorded as the output of the Workshop. The total potential dollars exceeded objectives by 150% and the proportion which were new ideas was approximately 60%.

The three projects which had as their objective the elimination of a quality problem produced surprising results. In all three cases the quality problem was completely eliminated and, in addition, substantial cost improvements were obtained. Fig. 1 shows an example of one of these projects. The construction of the doorstop was changed from three parts to one part which provided fully satisfactory functional performance, as well as greatly increased life characteristics. At the same time, the reduction from a three-part assembly to a single piece brought about a very worthwhile cost improvement. The multitude of good new ideas which were developed demonstrated the fact that everyone has some good ideas which can be unlocked to serve profitably the objectives of our business. An example of unlocking ideas is demonstrated by the projects shown in Fig. 2. A centering arrangement brings the refrigerator vegetable bin back to a position in line with the front of the cabinet so that the door can be closed without bumping the vegetable bins. This assembly had been used in two previous Value Seminars as a project for study. Each time the team made definite improvements which were put into effect. It was not until this workshop group studied this assembly functionally that the idea was born to use a leaf spring instead of the rather complicated spring and plunger assembly which had appeared so logical before. In looking back, we wondered why the previous teams did not think of this, and why in this case should such an excellent idea come from three people - none of whom are trained designers. The question could be asked, "Is this a reflection that the design was poor on these parts?" The answer is, "No." A basic law of
nature states that the ultimate truth is never attained, but may be approached more closely as creativity, combined with more knowledge and new environments, is applied. Also, no design should be assumed perfect; different people with different approaches and a different background of knowledge may always be able to bring new ideas or improvements to the design. In this case this team oriented its thoughts to the function of the parts of this assembly—then the team members stimulated each other's thinking process and the new idea was generated.

At the close of the Workshop, the Department General Manager had this to say, "The Value Analysis Workshop was the most effective value program we have conducted to date. The immediate results were very impressive. The foremen were particularly enthusiastic about the opportunity for applying new knowledge gained in their own operation. The team approach of key manufacturing and engineering people resulted in improved relations which provided an impetus to our continuing programs for quality and cost leadership."

**Long-Term Results of Workshop**

In order to measure the actual results of the projects developed in the Workshop, a team was set up to periodically review their progress. In this way we were able to measure in terms of actual dollars the progress of each project, comparing the savings against the length of time after the Workshop. We found that the projects followed one of several courses. Some were completely developed at the end of the Workshop and were put into production immediately. Others required engineering effort to make drawings and then performance tests. After the drawings were released, these were scheduled for production. Another group of projects was listed as dead a few months later because the models they applied to were dropped from our product line. Still others showed lower savings either because of further studies of the project or because of reductions in the number of models called for in the product line which now made this project look uninteresting in light of the necessary tooling. The following tabulation summarizes the workshop projects in these various categories as a percentage of the total original workshop "objective" number of dollars (in production and savings reported). By explanation, total ideas generated exceeded the workshop objective by 162%. In production, savings exceeded the objective by 15%.

<table>
<thead>
<tr>
<th>New Ideas</th>
<th>Old Ideas</th>
<th>Total</th>
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<tbody>
<tr>
<td>153%</td>
<td>109%</td>
<td>262%</td>
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**At End of Workshop—Total Ideas Generated**

**Two Years Later:**

- In production and savings reported: 67% 48% 115%
- Model dropped out: 27 0
- Rejected by specifications: 37 4
- Long range development: 30 10
- No implementation effort applied: 0 8
- Study showed no savings: 2 0
- No savings when tooled: 0 40
- Still being worked on: 1 0
Delays to Project Implementation

Fig. 3 shows an over-all summary of the generation and flow of workshop ideas. Of the many ideas which are generated at the project table, several were chosen to be further investigated. These are screened through engineering, manufacturing and marketing. The order and magnitude of screening vary depending upon the particular project. Those which survive, of course, are put into production and will produce a better product at a lower cost. As these ideas are screened in each of the functions shown in Fig. 3, they must pass detail screening as indicated in Fig. 4.

The first screen is set up from above by our boss or, perhaps, by his boss. The boss may continue an old standard—a test which used to apply and became permanently implanted in his mind as necessary. He may or may not hold to that old standard. Before throwing out the project, check him on that old standard. The boss may be worried about a history of failures of this type of an idea. The basic cause of those failures may not apply to the new idea. Check him. The state of the business will affect our boss; how much he needs a lower cost will affect his willingness to accept different approaches. Our boss is also subject to a certain amount of emotional thinking, and, in this case, his opinions may vary widely with no conscious basis. Of course, this is a luxury which is only permissible to management.

The second type screen is the purely personal screen which applies to ourselves and is caused by our background and experience. Probably the greatest retardant of objectivity is fear of personal loss. If a part is working satisfactorily now, why change it. If the change is successful, we are only doing our job. If the change creates production or quality problems, we are criticized.

As each responsible individual proceeds through life, he has specific experiences—perhaps either an exceptionally good or an exceptionally bad experience with white plastics. His screen then tends either to allow them through too easily or retard them too much thereafter. Perhaps the experience was with mis-applied stainless steel or with shell molding. If bad results occurred— for any cause—and embarrassment resulted, a dark spot is built in the personal screen of the individual whenever these materials approach the sphere of consideration.

Fear of loss of personal prestige must be considered carefully and ways must be set up to minimize it by substituting adequate re-
cognition for jobs well done. Our own standards may also be obsolete in view of material or environmental changes. We should constantly check our standards. A lack of priority can, of course, bring about no action on our part toward a worthwhile project. From a total profit standpoint, of course, this becomes a management problem to provide man-power where it is profitable. A lack of personal reward can bring about inactivity--this may be overcome simply by recognition of a good job or by a monetary value in some sense. We, too, have emotions which are not bounded properly by specifications and logical thinking. We must be aware of this hazard in our thinking process and check our own decisions.

The third screen in this series is really the only screen that should apply. This is the screen which tests the idea against specifications which are set on the product by our marketing and engineering people, and the acceptance specifications which are set by our customers. These will vary with the product but, in general, will be those concerned with life tests, performance tests, service call rates, shipping tests, appearance and customers' satisfaction. We should learn to emphasize this type of screen and minimize our use of the other screens which are apt to be truly the gray areas as they appear in our Fig. 4.

Fig. 5 illustrates a problem with these screens. Some specifications which were built up in the minds of the designer and manufacturing people indicated that the type of control assembly shown in the "after" photograph would not meet the performance specification and, furthermore, could not be physically assembled in the factory. The project remained dormant until a new engineer was assigned to this area. He was not blocked by the opinion that no change could be made and instituted trials of the proposed design. To the surprise of many except the new engineer the idea was feasible and, in fact, proved to be a better quality design.

Now let us turn our attention to the purely time-consuming elements or process steps involved between the development of the new ideas and the date when they are in production. The following is a list of typical steps:

1 - Value analyze to get new ideas and approaches.

2 - Verify cost estimate on new parts and necessary tooling.

3 - Study of idea by engineer or planner.

4 - Make sketches - engineer and draftsman

5 - Make models - Model Shop or Supplier
6 - Build up and test for performance and life.

7 - Re-do above if tests indicate changes.

8 - Obtain parts and make trial run.

9 - Life and performance test

10 - Decide, make, or buy all or part

11 - Establish supplier for part or tool

12 - Get Underwriters' Laboratory approval

13 - Get tool money.

14 - Process Drawing Change Notice and make drawing.

15 - If making, install tools and debug.

16 - Obtain parts and make trial run of 100 to 1000.

17 - Use up old parts.

18 - Schedule production.

19 - Coordinate groups of people.

20 - Combine with other changes.

When we think of the number of steps involved and the normal delay between each step in handling paper work, etc., then the delay during the processing of each step due to perhaps lack of priority or lack of interest, or fear of personal loss, and then further consider the number of people involved and the types of people and how they must be approached in order to obtain their cooperation, it is no wonder that these changes are slow to be culminated. In fact, we could be surprised that they ever get in. There is no panacea which will over-ride all this time delay. Each organization must consider its own process steps and initiate ways of moving these ideas through each step in a minimum of time. One effective method is to establish a team composed of all the key people in progressing the project and, in some way, provide an incentive for them to complete these projects in a minimum of time. This entire implementation effort can be improved by bringing standards up to date, overcoming personal loss by substituting personal gain, keeping an open-minded and enthusiastic climate throughout the organization, and providing an adequate reward for results.