

BUT WE ALREADY DO IT, AND OTHER MISUNDERSTANDINGS

Mike Kinnan, PE and Sam Martin, PE, CVS



Mike Kinnan is a registered professional engineer with 16 years Federal Government design experience. He is a mechanical engineer for the Mechanical Equipment Group for the Bureau of Reclamation. His expertise is in equipment for fish recovery and water delivery projects. He has been a value study team leader for more than ten studies.



Sam Martin is a registered professional engineer and certified value specialist with more than 20 years experience in engineering in both the private and government areas. First involved in Value Engineering in 1985, since 1992 he has been the Assistant Value Program Manager for the Bureau of Reclamation. He has written several training manuals in several fields and many papers on a variety of subjects. During his tenure at the Bureau of Reclamation, he has written several Value Method (Engineering) training manuals, Program Guidance documents, and information papers.

ABSTRACT

Mr. Miles often wrote about the many common misconceptions about value studies and using the Value Method. However, despite his and subsequent Value Method professionals efforts, misunderstandings about the Value Method persist. Often, they are the cause for management's reluctance to use it. Since Value Method professionals frequently have to address this subject in discussions, they need to respond appropriately to the most common misunderstandings. The Bureau of Reclamation (a bureau of the Department of Interior) has examined this problem and developed presentations to answer some of the more common misconceptions. Sharing the results of these efforts may be useful to other professionals in overcoming these misconceptions.

INTRODUCTION

Most activities are performed well, since an organization that does not work well generates dissatisfied customers. Continued dissatisfaction with the products or services results in business failure or painful government agency restructuring. Therefore, agencies go to great lengths to hire and maintain staff

that do excellent work. Most staff perform their work without using the Value Method (Value Engineering, Value Analysis, Value Management). However, to perform optimally they must have a good decision process. Few people are formally trained in decisionmaking practices. The majority learn decisionmaking practices through experience and from their mentors. For both the employer and employee, some lessons are more painful than others. The Value Method is a valuable decisionmaking process that shares many of the traits and techniques used by good managers, engineers, administrators, and other professionals who know how to make good decisions. Unfortunately, most managers are not aware of the benefits or specific details of value studies using the Value Method, and they often resist and cite reasons to avoid using the Value Method based on their misunderstanding.

MISUNDERSTANDING WHAT THE VALUE METHOD REPRESENTS

A major misunderstanding rests on the belief that the Value Method is something that is used to fix mistakes, and when it is mentioned, resistance and defensive behavior are the natural result. This misunderstanding can be clarified by explaining that

the Value Method is a process that everyone can and should use in their everyday work applications. People should understand that it is a highly effective decisionmaking process that has been thoroughly tested and is very reliable. People can be trained in its use, and when they follow its principles, the painful lessons can often be avoided. Few people perform all of the functions contained in the Value Method when making decisions, which occasionally results in poor decisions. When that happens, sometimes, others call for a value study. It is more important, however, for people to understand the process and its potential benefits, so they can incorporate the Value Method earlier and avoid poor decisions.

THE PRODUCT IS ALREADY AS GOOD AS IT CAN BE

Nothing is so perfect that it couldn't be improved. When an efficient process is used by a team, specifically selected for their high-performing team aspects to generate innovative concepts and analyze the results, it is difficult for them to avoid improving the product. The key to value is the amount of improvement; i. e., the probability that the value of the improvement will exceed the cost to produce the improvement. Many guidelines have been developed to establish a value for the potential benefit. It has been found that construction projects with more than one-half million dollars in construction costs typically generate enough added value to justify the cost of performing a value study. For administrative activities, one million dollars seems to be the threshold cost where a value study would be justified.

The Value Method has been in place in several government construction oriented agencies as a program since the 1960's and the cost reductions have increased as these programs matured. However, all the changes that have been made though the years have not generated a perfect product. Savings, added benefits and returns on value studies are not diminishing even though the projects studied now are "leaner and meaner" than those studied ten years ago. The Value Method continues to successfully take advantage of and encourage the use of innovation to achieve improvements, savings and added value.

For example, the initial concept for the Bureau of Reclamation Hungry Horse Dam Selective Withdrawal Structure was a large steel structure attached on the outside of the existing trashrack structure. This was a very workable solution and

used excellent technologies. Nonetheless, through the Value Method value study process, the project engineer suggested a design that was 40-percent of the original concept cost. Clearly, products can be improved through the use of a value study.

THERE IS NO TIME

When a schedule is established, the correct amount of time to perform the work adequately should have been estimated. Time for a value study and adjustments for its results can be scheduled at the beginning of the project. Few projects are so confined that time for a value study (typically less than 5 days) cannot be accommodated. Value studies have even been conducted to handle emergency situations with no preparation and immediate results required. Due to increased decisionmaking efficiency of the process, value studies can actually reduce a project's design and/or construction time. Additionally, if better alternatives are not discovered until later, the client will be unhappy with the added time required to incorporate the change. Accordingly, an early value study can avoid delays and subsequent discontent. Finally, while deadlines may not appear negotiable to the designer, most are to the customer and executive, particularly if sufficient added value is identified.

THERE IS NO MONEY FOR IT

Since the added value of the improved product usually exceeds the cost of performing the value study, the study pays for itself. Most companies and government, however, suffer from the "color of money" syndrome, where the design is paid from a different account than construction. Unfortunately, design funds are normally used to pay for the value study, even though it is in construction that the savings actually accrue. The window of opportunity for funding is getting shorter, and today more than ever it is critical to get things right the first time. Although "lean and mean" are often cited as operating words, on time and under budget has to become the rule instead of the exception. Accordingly, it is crucial that managers, administrators, designers, and entire organizations effectively employ the Value Method to its fullest, since the alternative is lost resources and jobs.

The Bureau of Reclamation has been comparing project cost estimates at a conceptual stage against the actual construction costs over two years and nearly 80 projects. What is interesting is that the average

typical cost of a project that was value studied was more than 7-percent below the original cost estimate. Projects that were exempted from study through a management selection process, however, project costs exceeded the original estimate by about 10-percent,

while projects that were not value studied or examined in a selection process typically exceeded the original estimate by more than 23-percent (Figure 1)

Project Performance

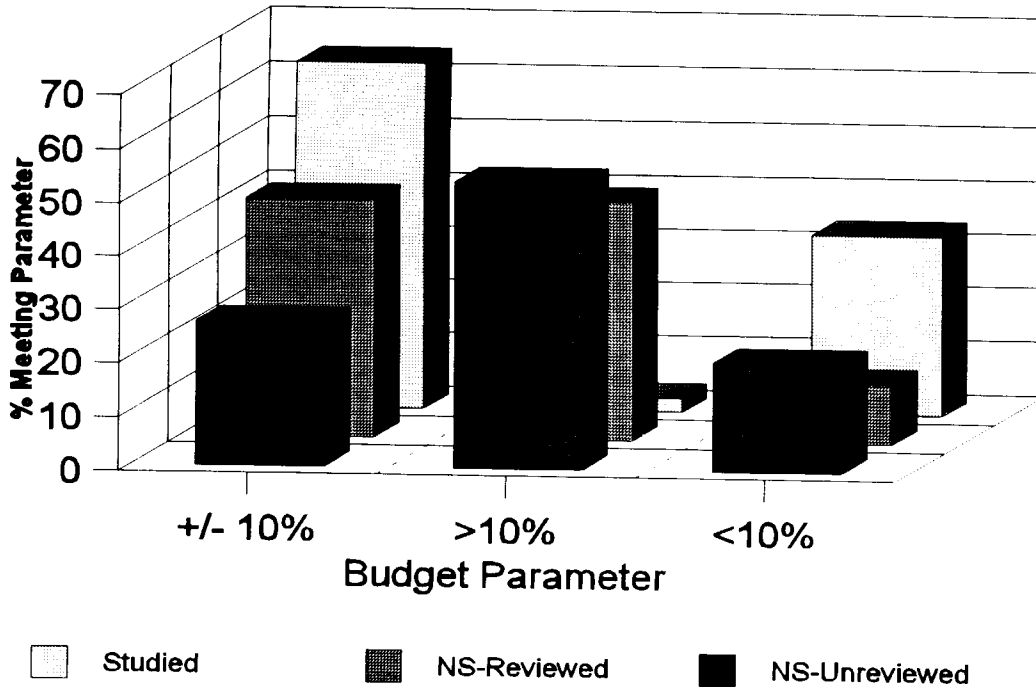


Figure 1. Comparison of project performance in terms of meeting original budget versus value study decision made.

Given this kind of performance, the question should be, "Will there be money for a study after the money has been spent for a design that exceeds its budget?" If a project estimate is over budget the first question that should be asked is, "Was a value engineering study done?" In these days of shrinking budgets, the project you save may be your own. As the competition for financial resources gets fiercer, projects that exceed the original estimate are subject to cancellation. Perhaps with the money being distributed elsewhere; never to return. Applying the Value Method helps to offset the insidious effect of cost creep, which are often the cause behind the over budget project.

EVERYONE HAS ALREADY AGREED TO THIS CONCEPT

There is always tremendous inertia against change.

Most projects start with an initial concept that is used to generate a schedule and a budget. It is easy to get locked into a concept, and obtaining agreement to deviate from the initial idea can be excruciatingly difficult. Using the Value Method with an independent team at a specified time, ensures everyone takes the time to measure the value of the initial concept against other, perhaps better, alternatives and methods. Used in this way the Value Method encourages everyone to be efficient, maintain an awareness of the latest technology advances, and remain open to other ways of achieving objectives. Conducting a value study is an opportunity to drastically change direction and do things differently before the design activities proceed full speed ahead. In the end it is still up to the customer, management, and owners to weigh the impact of making the proposed value changes against their potential

additional value. Most value studies, however, have at least one alternative that is accepted by everyone involved in the project.

WE ALREADY DO "VALUE ENGINEERING"

Although this statement is made by other professionals, this is one of the most common statements made by engineering designers, and it is rarely true. They are engineers and they do work very hard to give their clients the best value, however, engineering designers rarely perform value engineering on their project.

The statement, "We already do Value Engineering" stems from a misunderstanding of the difference between the concept of the designer putting value in their engineering, and the act of performing Value Engineering. Engineers consider value in their design decisions and many engineers rightly feel that value is a part of the definition of the word, "engineering." Indeed, Webster's dictionary defines engineering as: "The application of scientific and mathematical principles to *practical* ends such as the design, manufacture, and operation of *efficient and economical* structures, machines, processes, and systems." (Emphasis added.)

While performing Value Engineering produces results consistent with the above definition, it is different from design engineering. Value Engineering is a specific use of the Value Method process. To obtain an optimum solution, the designer can apply the Value Method several times throughout the project as a highly efficient decisionmaking process. An independent Value Engineering team can add expertise and a fresh perspective to both the decisionmaking and the customer requested end product results.

Design engineers have a discovery and decision process that they follow to obtain the product they understand is expected. Their process helps them find out what they perceived they need to know. Then, the engineer generates a design, using engineering principles, to obtain the apparent optimum product for the customer. Their decision process rarely, if ever, uses functions, function logic diagrams, or value-based comparative analysis methods. Occasionally, due to the failure to ask a question that no one dreamed would need to be asked, a key parameter affecting the customer's satisfaction with

the product is missed. This is one reason why the Value Method is a good partner and provides a useful check and balance to the existing design process.

The Value Method uses a value-based decisionmaking approach to assure that resources (e.g., time, money, and expertise) are directed toward the solutions that have the highest potential for meeting the customer needs at the optimum cost. Further, the Method attempts to obtain the largest number of creative solutions to widen the potential for better value. When the process is complete, a design, using engineering principles and the results of the Value Engineering analyses, that obtains the apparent optimum product for the customer is generated.

In contrast, the designers usually try to keep project costs down by looking for the most efficient designs. Often, the project has been through a few stages and an assumed type of solution was selected during the initial scoping and project definition stages. The process that preceded the designer's involvement may have been devoid of discussions of function, design parameters, etcetera. Unfortunately, after a concept has been selected, potential savings are usually limited to ideas that will not impact schedules or the design budget. Designers usually consider an alternative that would take the project in a new direction, even one that may have the potential to drastically increase value, to be unacceptable.

Another aspect of the misconception occurs because, most projects involve several disciplines where each person is focused on their individual component(s) of the project. Unlike Value Engineering, an overall view of the project value is rare until the later stages of design, when the individual component's design, which although well designed for function, efficiency, and cost effectiveness, may be satisfying an inappropriate or unnecessary function.

Further, when the design team is generating alternatives, it is rarely given the time or freedom for focused brainstorming and revisiting criteria. An independent team provides objectivity for generating new concepts and questioning preconceptions, which is critical when projects can be so strongly driven by politics, expediency, or the influence of strong personalities. Using the Value Method provides the critical framework to objectively assess customer's, critic's, and taxpayer's demands and challenge the tendency to over design. It clearly assigns costs to

functions and shows which functions should be reviewed. It breaks down the barrier of questioning the methods used by other disciplines. Thus, when engineers use the Value Method, they can often

improve the project to achieve greater success. Some of the key differences between "putting value in your engineering" and "performing Value Engineering" are illustrated in Table 1.

| Item | Putting Value in Your Engineering | Performing Value Engineering |
|-----------------|--|--|
| Task | Solve the problem. | Make sure the right problem is being solved. |
| Team Priorities | Meet project objectives, safety criteria, budget, schedule, etc. Look for value mismatches in "spare time". | Find value mismatches and investigate alternatives that increase value. |
| Team Makeup | Technical expertise for meeting project objectives. | Independent Team used to provide objectivity and fresh look. Client, stakeholder are included in the value study team. |
| Process | Value mismatches may be hidden. | Proven process makes value mismatches more apparent. |
| Constraints | Constraints, perceptions and traditional methods are given to the engineering team and may or may not be challenged. | Constraints, perceptions and traditional methods are revisited with input from clients, owners and stakeholders. |
| Accountability | Results are anecdotal. | Results are measured against goals. |

Table 1. Engineering design versus Value Engineering points.

KEYS TO SUCCESS

The Value Method assigns a team, given the responsibility and the time by management, to the specific task of looking for proposals that meet a project's goals at a greater value. This emphasis assures that time is taken to correctly apply the Value Method. When a dedicated team is given a task, a deadline, adequate resources, and uses good sound principles, the result is a high quality product. There are many benefits to increasing value on a daily basis, but there are no short cuts around the Value Method.

The requirement for accountability generates measurable results, especially when implemented as a program that performs the Value Method on projects that meet accepted selection criteria and track results. When a Value Method program is not in place there is no way to know if value is being put into your engineering. More than likely, value enhancement is going on, but how can you show to what extent? Without a measurable goal and without

a way to measure results you are left with anecdotal success stories of decisions that increased a project's value.

SUMMARY

There are many misconceptions regarding the value method, its application, and how it relates to various parameters. It is evident from Larry Miles' writings that he fought these problems too. Just as the Value Method strives to continually produce innovative alternatives, we must continue to find ways to address the misconceptions that surround the Value Method and value studies. The Value Method has stood the test of time in it's evolution. As the Value Method's body of professionals, our job is to overcome obstacles to value and the misunderstandings that surround the Value Method would seem to be one of the greatest obstacles that we must overcome.

REFERENCES

FY95 Value Program Summary of Activities Report,
December 1995, Bureau of Reclamation.

FY96 Value Program Summary of Activities Report,
December 1996, Bureau of Reclamation.

Miles on Value Analysis, Part 1, Purchasing World
Reprints, Larry Miles, 1986, International Thomson
Industrial Press.

Miles on Value Analysis, Part 2, Purchasing World
Reprints, Larry Miles, 1986, International Thomson
Industrial Press.

*"Value Engineering? Oh Yeah, We Do That All The
Time Anyway!"*, Michael S. Adams, AIA, PP, CVS,
October 10, 1996, Adams Associates.