

# VALUE METHODOLOGY STANDARD



**SAVE**  
**INTERNATIONAL**  
*"The Value Society"*

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Proposed update involving replacement of Glossary section with the Dictionary and Glossary previously created and approved by the College of Fellows and published as an element of the SAVE Consultants Directory. This version reviewed and approved on December 2, 1997 by Joseph Lambert, SAVE President. It was reviewed, slightly modified, and approved by the SAVE Executive Committee. It is being submitted to the College of Fellows for a rigorous review and update.

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# VALUE METHODOLOGY STANDARD

## FOREWORD

Since 1947 the methods, technology and applications of the Value Methodology (VM) have greatly increased and expanded. VM includes the processes known as Value Analysis, Value Engineering and Value Management. It is sometimes also referred to as Value Control or Value Improvement. This Standard defines common terminology, offers a standardized Job Plan — while allowing the great diversity of individual practices that have been successfully developed — and is offered to reduce confusion to those being introduced to the VM. The Standard includes the approved VM Job Plan, the Body of Knowledge as developed by the SAVE International professional Certification Board typical profiles of the Value Specialist and Value Manager, duties of a Value Program unit, a glossary or dictionary, and an appendix of references.

## VM APPLICABILITY

- A. VM can be applied wherever cost and/or performance improvement is desired. That improvement can be measured in terms of monetary aspects and/or other critical factors such as productivity, quality, time, energy, environmental impact, and durability. VM can beneficially be applied to virtually all areas of human endeavor
- B. VM is applicable to hardware, building or other construction projects, and to "soft" areas such as manufacturing and construction processes, health care and environment services, programming, management systems and organization structure. The pre-study efforts for these "soft" types of projects utilizes standard industrial engineering techniques such as flow charting, yield analysis, and value added task analysis to gather essential data.
- C. For civil, commercial and military engineering works such as buildings, highways, factory construction, and water/sewage treatment plants, which tend to be one time applications, VM is applied on a project-to-project basis. Since these are one time capital projects, VM must be applied as early in the design cycle as feasible to achieve maximum benefits. Changes or redirection of design can be accomplished without extensive redesign, large implementation cost, and schedule impacts. Typically for large construction projects, specific value studies are conducted at the concept stage, during the schematic stage and then again at the design development (up to 45%) stage. Additional value studies may be conducted during the construction or build phase.
- D. For large or unique products and systems such as military electronics or specially designed capital equipment, VM is applied during the concept or design cycle to assure meeting of goals and objectives. Typically a formalized value study is performed after preliminary design approval but before release to the build/manufacture cycle. VM may also be applied during the build/manufacture cycle to assure that the latest materials and technology are utilized.
- E. VM can also be applied during planning stages, and for project/program management control by developing function models with assigned cost and performance parameters. If specific functions show trends toward beyond control limits, value studies are performed to bring the function to within objectives.

## VALUE STUDY TEAM

Two keys to the successful application of a value study are the skills and experience of those applying the methodology. While the methodology can, and often is, used by individuals, for significant projects it has been proven that a well organized team obtains the best value for effort performed.

The Team Leader performs a key role and is a significant factor in the degree of success. The Team Leader must have thorough training in both VM and team facilitation. The requirements include strong leadership, communication skills, and experience working with users/clients.

The size and composition of the team is project dependent. The members should represent a diverse background and experience that incorporates all the knowledge required to fully cover the issues and objectives of the project. Typically these include cost estimating, procurement/materials, and those technical disciplines unique to the project such as design, manufacturing, construction, environmental, and marketing.

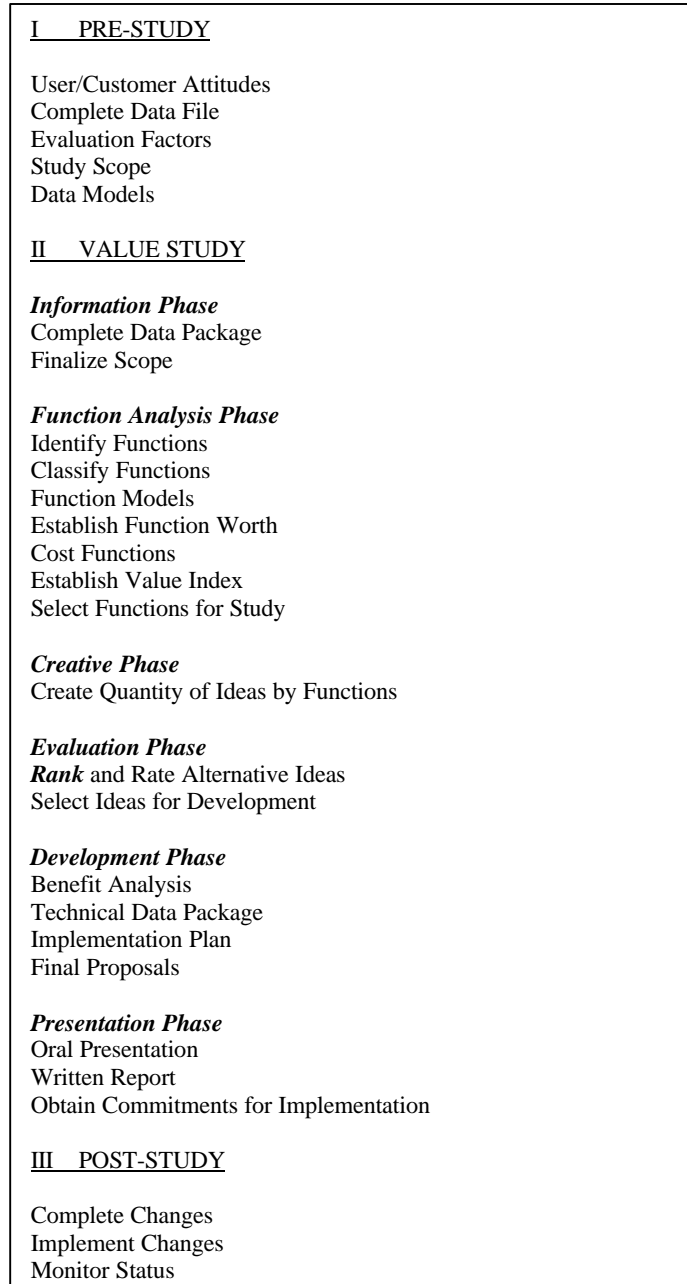
It is most advantageous if either the team leader, or a team member, will have the responsibility for implementation of the approved value proposals at study completion.

It is most desirable if the teams are selected and empowered by the top operational executive. This executive informs the team(s) that they are responsible for the development and implementation of value improvements, and not merely their recommendation.

Decisions reached based primarily upon one technical discipline will often have significant effects on other disciplines within the project. Thus multi-disciplinary interaction greatly increases the effectiveness of the total value improvement. In addition to technical competence, criteria for selection of team member should include a capability to generate positive attitudes and a willingness to investigate new ideas and then rationally evaluate them.

## THE VM JOB PLAN

The VM uses a systematic Job Plan (figure 1). The Job Plan outlines specific steps to assure effective analysis of a product or service and to assure development of the maximum number of alternatives to achieve the required functions of the products or services under study. Adherence to the Job Plan will better assure maximum benefits while permitting great flexibility.



**Figure 1: The VM Job Plan**

The Job Plan covers three major periods of activity: Pre-Study, the Value Study, and Post-Study. All phases and steps are performed sequentially; however, as a value study progresses new data and information may cause a "looping back" within each period. Phases or steps within phases are not skipped.

## I PRE-STUDY

Preparation tasks involve five principle areas: collecting/defining User/Customer wants and needs, gathering a complete data file of the project, determining evaluation factors, establishing the scope of the specific study, building appropriate models, and determining team composition.

### A. Collect User/Customer Attitudes

The User/Customer attitudes are compiled via an internal or external market survey or target opportunity panel. The objectives are to:

1. Determine the prime buying influence.
2. Define and rate the importance of features and characteristics of the product or project;
3. Determine and rate the seriousness of user-perceived faults and complaints of the product or project;
4. Compare the product or project with competition or through direct analogy with similar products or projects.

For first time projects such as a new product or new construction, the analysis may be tied to existing products or projects having equivalent functions.

The results of this task will be used to establish Value Targets in the Function Analysis Phase.

### B. Gathering a Complete Data File

There are both Primary and Secondary sources of information. Primary sources are of two varieties: people and documentation. People sources include marketing (or the user), original designer, architect, cost or estimating group, maintenance or field service, the builders (manufacturing, constructors, or systems designers), and consultants. Documentation sources include drawings, project specifications, bid documents and project plans.

Secondary sources include suppliers of similar products, literature such as engineering and design standards, regulations, test results, failure reports, and trade journals. Another major source is like or similar projects. Quantitative data is desired.

Another secondary source is a site visitation by the value study team. The term "site" can mean the actual construction location, manufacturing line, or office location for a new/improved system. If the actual "site" is not available, facilities with comparable functions and activities may prove to be a valuable source of usable information.

### C. Determine Evaluation Factors

An important step in the process is to agree on what will be the criteria for evaluation of ideas, the relative importance of each criterion to final recommendations and decisions for change. These criteria and their relative importance are discussed with the user/customer and concurrence obtained.

### D. Establish the Scope of the Study

The team develops the scope statement for the specific study. This statement defines the limits of the study based on the data gathering tasks. The limits are the starting point and the completion point of the study. Just as importantly, the scope statement defines what is not included in the study. The scope statement must be verified by the study sponsor.

### E. Models

Based on the completion and verification of the scope statement, the team may compile appropriate models for further understanding of the study. These include models such as Cost, Energy, Time, Flow charts, and Distribution, as appropriate for each study.

### F. Wrap Up

The Value Study Team Leader confirms the actual study schedule, location and need for any support personnel. The study team composition is reviewed to assure all necessary customer, technical, and management areas are represented. Specific assignments concerning informational data needs are assigned to team members or to other designated experts

to be available for the value study.

## II THE VALUE STUDY

The value study is where the primary VM is applied. The effort is composed of six phases: Information, Function Analysis, Creativity, Evaluation, Development, and Presentation.

### A. Information Phase

The objective of the Information Phase is to complete the value study data package started in the Pre-Study work. If not done during the Pre-Study activities, the project sponsor and/or designer brief the value study team, providing an opportunity for the team to ask questions based on their data research. If a site visitation was not possible during Pre-Study, it should be completed during this phase.

The study team agrees to the most appropriate targets for improvement such as value, cost, performance, and schedule factors. These are reviewed with appropriate management, such as the project manager, value study sponsor, and designer, to obtain concurrence.

Finally, the scope statement is reviewed for any adjustments due to additional information gathered during the Information Phase.

### B. Function Analysis Phase

Function definition and analysis is the heart of VM. It is the primary activity that separates VM from all other "improvement" programs. The objective of this phase is to identify the most beneficial areas for continuing study. The following steps are performed:

1. Identify and define the functions of the product, project, or process under study using active verbs and measurable nouns. This is often referred to as Random Function Definition.
2. Classify function as basic and secondary or supporting.
3. Expand the function list (optional).
4. Build a function model in the form of a "User" or "Technical" Function Analysis System Technique (FAST) diagram.
5. Assign cost and/or other measurement criteria to functions.
6. Establish worth of functions by assigning the previously established user/customer attitudes to functions.
7. Compare cost to worth of functions to establish the best opportunities for improvement. These are referred to as value targets.
8. Assess functions for performance/schedule considerations.
9. Select functions for continued analysis.
10. Refine study scope.

This portion of a value study is often performed within the Information Phase.

### C. Creative Phase

The objective of the Creative Phase (earlier referred to as the Speculation Phase) is to develop a large quantity of words, ideas, or concepts for performing each function selected as a target for study. This should be a creative effort, totally unconstrained by habit, tradition, negative attitudes, assumed restrictions, and specific criteria. No judgment or discussion occurs during this activity. Each of the large quantity of words, ideas and concepts developed in this phase will serve as the grist for the next phase: the Evaluation Phase

There are two keys to successful creativity: first, the purpose of this phase is not to conceive of ways to design a

product or service, but to develop ways to perform the *functions* selected for study. Second, creativity is a mental process in which past experience is combined and recombined to form new combinations. The purpose is to create new combinations that will perform the desired functions at less total cost and with improved performance than was previously attainable.

There are numerous well-accepted idea generation techniques. The guiding principle in all of them is that judgment/evaluation is suspended. Free flow of thoughts and ideas - without criticism - is encouraged.

#### D. Evaluation Phase

The objective of the Evaluation Phase is to synthesize ideas and/or concepts from the words and ideas created in the Creative Phase and then to gather and analyze data concerning these ideas and concepts, and finally to select feasible ideas for development into specific value improvements.

Using the evaluation criteria established during the Pre-Study effort, ideas are sorted and rated as to how well they meet those criteria. The process typically involves several steps:

1. Group similar words and ideas by category within long term and short term implications. Groupings are electrical, mechanical, structural, materials, special processes, etc. (This step is optional.)
2. Have one team member agree to voluntarily "champion" each idea during further discussions and evaluations. If no team member so volunteers, the idea or concept is dropped.
3. List the advantages and disadvantages of each idea.
4. Rank the ideas within each category according to the most important evaluation criteria using such techniques as indexing, numerical evaluation, and team consensus.
5. If competing combinations still exist, use matrix analysis to rank mutually exclusive ideas satisfying the same function.
6. Select ideas for development.

If none of the final combinations appear to satisfactorily meet the criteria, the value study team returns to the Creative Phase.

#### E. Development Phase

The objective of the Development Phase is to select and prepare the "best" alternative(s) for improving value. The data package prepared by the champion for each of the alternatives should provide as much technical, cost, and schedule information as practical so the designer and project sponsor(s) may make an initial assessment concerning their feasibility for implementation. The following steps are included:

1. Beginning with the highest ranked value alternatives, develop a benefit analysis and a set of implementation requirements, including estimated initial costs, life cycle costs, and implementation costs, taking into account risk and uncertainty.
2. Conduct performance benefit analysis.
3. Compile a technical data package for each proposed alternative, including:
  - a. Written descriptions of original design and proposed alternative(s).
  - b. Sketches of original design and proposed alternative(s).
  - c. Cost and performance data, clearly showing the differences between the original design and proposed alternative(s).
  - d. Any technical back-up data such as information sources, calculations, and literature.
  - e. Schedule impact.



4. Prepare an implementation plan, including proposed schedule, a detailed Gantt Chart of all implementation activities and team and/or management assignments.
5. Finalize recommendation including any unique conditions to the project under study, such as emerging technology, political concerns, impact on other ongoing projects, marketing plans, etc.

F. Presentation Phase

If the team members have been properly selected and empowered by the top operational executive, the objective of the Presentation Phase is not to obtain concurrence and a commitment from the designer, project sponsor, or other management to proceed with implementation of the recommendations. It is, instead, to report to that top operational executive what action the team has decided upon as most beneficial to the value of the product under study. This involves an oral presentation with a simultaneous complete written report.

The written report documents the alternatives proposed with supporting data and detailed implementation plans. Specific organization of the report is unique to each study and organization requirements.

### **III POST-STUDY**

The objective during Post-Study activities is to assure the implementation of the approved value study change recommendations. Assignments are made either to individuals within the VM study team, or by management to other individuals, to complete the tasks associated with the approved implementation plan.

While the VM Team Leader may track the progress of implementation, in all cases the design professional is responsible for the implementation. Each alternative must be independently designed and confirmed, including contractual changes if required, before its implementation into the product, project, or process.

## **VALUE PROFESSIONAL PROFILES**

### **VALUE PROGRAM MANAGER**

Reports to:	General Manager or member of Executive Staff
Education:	4-year college degree or 5 years relevant experience Module I VM Workshop or equivalent Module II Advanced Seminar
Experience:	3 years (minimum) in specialized industry or government 2 years in VM
Qualifications:	Technical Aptitude Team Leadership Skills Effective Communicator Understands Manufacturing, Procurement, Contracts, Costs Training Aptitude
Personality:	Leader Resourceful Communicator

### **VALUE PRACTITIONER**

Reports to:	Value Program Manager
Education:	4-year college degree or 5 years relevant experience
Experience:	Module I VM Workshop or equivalent
Qualifications:	3 years (minimum) in specialized industry or government
Personality:	Creative Effective Communicator Team Oriented Not Easily Discouraged Resourceful Respected within Organization

Technical Aptitude: Understanding of Manufacturing/Construction, Procurement, Subcontracting, and Costs.

### **CERTIFIED VALUE SPECIALIST**

SAVE International maintains a professional certification program, the function of which is to recognize individuals who use the VM in their principal career and who have met the approved education and experience standards. Those standards include:

1. Completion of Module I workshop and Module II training course.
2. A minimum of two year's full time work experience in the VM field.
3. Demonstration of required performance in value studies.
4. Demonstration of continued growth through learning, teaching, presentations/writing, and contributions to the VM profession.
5. Submission of an original paper concerning any value related subject.
6. Successful completion of the Value Theory and Practice examinations.

To assist certification candidates, the Certification Board has issued a Body of Knowledge listing topical areas with which any qualified Value Specialist should be familiar.

## **BODY OF KNOWLEDGE**

1. Fundamental Value Concepts
  - A. VM History and Characteristics
    1. Historical development of the VM
    2. Types of value
    3. Relation of quality and value
    4. Primary VM questions (six): What is it? What does it do? Etc.
    5. Fundamental value principles and methods
    6. Differentiating the VM from other methods
  - B. Job Plans
    1. Three major stages and individual Job Plan phases
    2. Objectives of each stage and Job Plan phase
    3. Variations of Job Plans
    4. What the VM team does during each phase of the Job Plan
  - C. Function Analysis Basics
    1. Defining functions
    2. Classifying functions
    3. Types of function models
  - D. Function/Cost
    1. Purpose
    2. Allocating costs to functions
    3. Pareto Analysis
    4. Cost models vs. function-cost models
  - E. Function Worth
    1. Cost-value relationship
    2. Good and poor value functions
      - a) Value index
      - b) Customer input
      - c) High cost and low cost functions
    3. Establish worth of functions

- F. Creativity and Creative Processes
  - 1. Creating by function
  - 2. Techniques to help generate ideas
- II. Concept Application
  - A. Defining Functions
    - 1. Verb-Noun language
    - 2. Higher orders of abstraction
  - B. Classifying Functions
    - 1. Basic function
    - 2. Secondary or supporting functions
    - 3. Higher order function
    - 4. Assumed function
  - C. Allocating Costs to Functions
  - D. Determining the Value Index
    - 1. Relationships of Function Worth and Function Cost
    - 2. Good value and poor value
  - E. Function Modeling
    - 1. Basic types of Function Analysis System Technique (FAST) Diagrams
      - a) "User" FAST
      - b) "Technical" FAST
    - 2. Characteristics and Construction of FAST Diagrams
      - a) Scope lines
      - b) How? - Why? Logic
      - c) Elements of a FAST diagram
      - d) Good relational logic paths of functions
      - e) Critical path of functions where applicable
      - f) Placement of design objectives where applicable
    - 3. Allocating costs and other measures to function models
  - F. Financial Analysis
    - 1. Cost estimating/control systems
      - a) Direct and indirect costs
      - b) Fixed and variable costs

- c) Financial impact of VM proposals
  - d) VM's relationship to and use of financial systems
  - e) Contracting for Value services
    - (1) VM team
    - (2) Designers, architects, etc.
    - (3) Support personnel
2. Contracting for VM
    - a) Calculating net savings
    - b) Sharing incentives
    - c) Types of clauses/contracts used in public and private sectors
  3. Break-even Analysis
  4. Life Cycle Cost Analysis
  5. Value Studies
    - a) Net and gross costs
  - b) Return of study cost
  - c) Implementation and programmed costs
  - d) Hurdle rates

### III. Management of Value

- A. Organizing and implementing VM programs
- B. Management's role
- C. Value team composition
- D. Team leader skills
- E. Managing VM teams and studies

### IV. Value Analysis Education

- A. Basic Value Analysis Education
  1. Module I training workshop content
  2. Module II seminar content
- B. Related Programs

## **TYPICAL DUTIES OF A VALUE PROGRAM UNIT**

- A. Maintain up-to-date knowledge of the "State of the Art" of VM theory and practice.
- B. Select specific projects for VM study and have them approved by management/customer and secure team members to perform the study.
- C. Lead and coordinate all VM studies.
- D. Assist management in setting annual goals. Report monthly on progress on ongoing projects, projects completed, and projects scheduled. Reports should demonstrate expenditures vs. benefits line item status of each project educational program status and return-on-expenditure history.
- E. Plan and conduct VM training courses to assure a cadre of basic trained personnel for studies.
- F. Conduct management orientations and briefings as appropriate. Be available for similar briefings in VM for customers and clients.
- G. Work with the procurement organization to involve vendors, suppliers and subcontractors in the VM program. Develop methods of inviting their suggestions for value improvements and a sharing arrangement for those suggestions. Support procurement in any VM oriented change proposal negotiations.
- H. Monitor the implementation of accepted VM proposals to assure maximization of potential benefits.
- I. Represent the organization in the community concerning value improvement. Contribute to the VM profession's growth through participation in technical conferences, lecturing at colleges etc.

# GLOSSARY

## Use of this Glossary:

The function of a dictionary, like Webster's, for example, is to:

- define word (single word)
- establish priority (of definition)
- determine range (of usage)
- provide spelling

To avoid duplication and confusion with standard dictionaries, our standard definitions include only groupings of two or more words. Single word definitions are left to the dictionary.

Terminology becomes unique to a technology through the use of modifiers (adjectives) to further define normally defined nouns in the following manner:

- use value
- esteem value
- basic function
- secondary function
- job plan
- value engineering
- value analysis
- production cost
- overhead cost

A careful research of existing literature shows that value technology uses two word combinations in a special way to have special meaning to those employing it.

For ease of reference, terms are listed in the Value Dictionary alphabetically by noun, then alphabetically by modifier. For example, the above group would be listed in the following manner.

- analysis, value
- cost, overhead
- cost, production
- engineering, value
- function, basic
- function, secondary
- plan, job
- value, esteem
- value, use

In addition, when more than one definition is provided, they are listed in the order of preference or more common usage.

## Standard Dictionary Terms

Presented for reference are portions of definitions of terms as normally given by standard dictionaries. Where use of these terms appear in our definitions, note the extent of meaning.

**Benefit** . . . anything contributing to an improvement in condition....

**Function** . . . the intended operation of an item or service in its normally prescribed manner....

**Methodology**, . . . the division of pure logic that treats of the methods of direction the means of thinking to the end of clear and connected thinking

**Product** . . . anything produced or obtained as a result of some operation of work, as by generation, growth, labor, study or skill....

[as used herein, product includes both goods and services, and goods and services include all areas of endeavor]

**Program** . . . public proclamation; official edict or decree; normally something planned, funded, conducted, monitored, and measured....

**Technique** . . . working methods or manner of performance. as in art, science. etc....

**User** . . . a person that uses....

[as used herein, user includes customer, buyer, owner, or maker: i.e.; a maker uses product to advertise. warn, guarantee, identify maker and or source of repair]

**Value** . . . a fair or proper equivalent in money, commodities, etc., esp. for something sold or exchanged; fair price or return: the worth of a thing in money or goods at a certain time; market price; purchasing power; that quality of a thing according to which it is thought of as being more or less desirable, useful, estimable. important, etc.; worth or the degree of worth....

**Worth** . . . material value, esp. as expressed in terms of money or some other medium of exchange; that quality of a thing that lends importance, value, merit, etc. and that is measurable by the esteem in which the thing is held: the amount or quantity of something that may be had for a given sum [a dime's worth of nuts]; equal in worth or value to [a book that is worth \$50.00] .... (SYN) — worth and value are used interchangeably when applied to the desirability of something material as measured by its equivalence in money, goods, etc. [the worth or value of a used car], but in discrimination, 'worth' implies an intrinsic excellence resulting as from superior qualities, and "value" suggests the excellence attributed to something with reference to its benefits...



## Glossary (Dictionary of terms for VM)

**accounts, code of** — 1. A set of numbers used to categorize major components of the whole product or components of general company overhead, 2. A set of numbers used in estimating to group costs, 3. In construction, a hierarchical set of numbers used to represent the whole project e.g., the 16 Division CSI set or the 12 System UNIFORMAT set).

**alternative, function** — A different method or way (in terms of a product] to achieve the desired result.

**analysis, function** — 1. The study of product performance using two words, a verb, ideally an active verb, followed by a noun, ideally a measurable noun which is demonstrable on a non-verbal basis. 2. The methodology of value analysis.

**analysis, functional** — A mathematical technique originated by Vito Volterra in 1887 involving the use of integro-differential equations. (Not related to The Value Methodology in any way.)

**analysis, future value** — An economic technique to accumulate costs occurring at various points in time to their equivalent value at a specified future point in time.

**analysis, life cycle cost** — The comparison of acceptable alternatives on the basis of their contribution to life cycle costs using present value or annualized cost methodology.

**analysis, present value** — An economic technique to discount costs occurring in future years to their equivalent current value and sum them.

**analysis, value** — 1. A method for enhancing product value by improving the relationship of worth to cost through the study of function, 2. A methodology using an organized approach [job plan] with an organized effort [multidiscipline team] to provide required functions at lowest overall cost consistent with achieving required acceptance or performance, 3. The determination of the value of product functions as perceived by the user/customer in the marketplace.

**analyst, value** — One who uses value analysis methodology to study a product and search for value improvement.

**assurance, value** — See value analysis,

**benefit, function** — The life cycle advantages, income, or revenue attributable to provision of a function.

**characteristics, essential** — The minimal or necessary operational, maintenance, safety, performance and reliability needs of the customer which must be fulfilled.

**control, value** — See value analysis.

**cost, acquisition** — The price paid to procure a product not produced in house.

**cost, annualized** — An economic technique to convert any defined set of present value costs to an equivalent uniform annual amount for a fixed period.

**cost, application** — See customer cost.

**cost, breakeven** — 1. The point, for a given quantity of product, where the cost to purchase the product is the same as the cost to manufacture it in-house, 2. The quantity at which two competing acquisition alternatives are equal in cost.

**cost, conversion** — The money expended to convert raw material, or an unfinished product, into the desired usable end product.

**cost, customer** — Product price of acquisition paid by a customer.

**cost, development** — 1. The amount spent on product research, design, models, pilot production, testing, and evaluation, 2. Cost normally considered product overhead and distributed as fixed cost over an estimated number of products to be produced.

**cost, differential** — The difference in the life cycle cost between two competing alternatives.

**cost, direct** — 1. Cost that is directly identifiable with and attributable to the production of one specified product, 2. *Cost* that cannot be allocated to more than one product.

**cost, direct labor** — The amount expended for salaries and wages to provide a product.

**cost, essential** — All cost necessary to provide basic function.

**cost, factory** — See manufacturing cost,

**costs, fixed** — 1. Cost incurred which is not dependent upon the quantity of products produced, 2. Costs that do not vary with the volume of business, such as property taxes, insurance, depreciation, security, and basic water and utility fees, 3. Expenses for labor, material, equipment, and tools to produce the first product.

**cost, function** — 1. The proportion of product cost allocated to functions performed by the product, 2. All costs directly associated with the performance of a particular function, 3. Costs required for the realization of a function.

**cost, general & administrative** — A special classification of overhead cost normally apportioned to products; includes salaries for executives, managers, administrative and clerical staff as well as general office supplies and, equipment, marketing and, as specified, may include advanced design, research, and other administrative costs.

**cost, incremental** — 1. The difference in product cost between established incremental levels of product performance, 2. The add-on, alternative, accessory, or choice cost which takes into account the availability of existing resources when adding a new system, 3. Also referred to as variance cost.

**cost, indirect** — 1. See overhead cost, 2. Also called indirect burden.

**cost, indirect labor** — The amount expended for employee benefits, i.e.; retirement, health insurance, vacation, other leave, unemployment compensation, and bonuses.

**cost, investment** — The initial costs of product development, excluding sunk costs, which are assumed to occur as a lump sum in a base year.

**cost, labor** — The sum of direct labor cost and indirect labor cost.

**cost, life cycle** — 1. The sum of all acquisition, operation, maintenance, use and disposal costs for a product over a specified period of time, 2. The sum of all Costs for the development, procurement, production, and installation of a product, as well as for its financing, taxes, operation, logistic support, maintenance, modification, repair, replacement, and disposal over the period of its useful life, 3. In manufacturing it is also referred to as the sum of development, production, and application cost, 4. The economic measure of value.

**cost, logistic support** — 1. The cost of spare and replacement parts and equipment with associated installation labor, 2. The cost of periodic maintenance and repair, 3. The cost for those activities necessary to plan for and provide support programs, such as logistics, and field engineering, publications, supply support, spares, training, administration of logistic functions, and repair coordination, 4. In the military, the cost for details embracing the transport, quartering, and supply of troops.

**cost, lowest total** — The lowest life cycle cost.

**cost, manufacturing** — The sum of the costs expended for direct material, direct labor, and factory overhead costs for a product.

**cost, material** — 1. The cost expended for raw purchased materials needed to produce a product, 2. Normally includes the cost for packaging, inspection, shipping, and delivery of purchased materials.

**cost, non-recurring** — 1. Items of cost that represent one time expense at predicted times in the future, 2. Normally includes the cost for packaging, inspection, shipping and delivery of purchased materials.

**cost, overhead** — 1. Costs apportioned to products from overhead accounts, 2. Costs which cannot be specifically and directly charged to a single product as being solely incurred by that product such as development. supervision. tooling, maintenance, heat, power; light, buildings, taxes, and financing, 3. Usually fixed costs, 4. Also called indirect costs or burden.

**cost, ownership** — 1. The cost to acquire, operate, maintain. repair, and dispose of the product during its period of use, 2. The cost to possess the product including all finance charges. taxes. insurance. and loss of product use when it is out of service.

**cost, product** — 1. The sum of manufacturing, general and administrative, and selling costs, 2. The total expense to produce a product. 3. The transfer of money, labor, time or other personal items to achieve an objective. 4. One component of price.

**cost, production** — See manufacturing cost.

**cost, recurring** — 1. Repetitive production costs that vary or occur with the quantity being produced, 2. Cost expressed in terms of a recurring direct unit cost of production of an item consisting of labor, direct burden, materials, purchased parts, expendable tooling, quality control, test, inspection, packaging, and shipping. 3. Costs which are repetitive throughout a product's useful life.

**cost, relative** — 1. Differential costs between various products or functions rather than actual or absolute costs, 2. Costs which show order of magnitude only and the order of expense from greatest to least.

**cost, replacement** — Future costs to replace a product or product component which is expected to occur during the product life.

**cost, retrofit** — The cost to incorporate a product improvement or necessary change into an older product.

**cost, standard** — 1. Cost calculated on accepted productivity and material rates used as a norm against which to compare actual performance, 2. Costs accepted as the basis for budgeting or allocation of funds.

**cost, supplier** — The price a manufacturer pays for generally off-the-shelf purchased parts, materials, and supplies as contrasted with "sub-contractor costs" who generally do some degree of product manufacturing.

**cost, total** — 1. All cost for someone to acquire, use, enjoy, maintain, and dispose of a product, plus the time, effort and risk of buying. 2. See life cycle cost.

**cost, unnecessary** — 1. Costs for functions not desired, 2. Cost for quality or performance above that needed by the user, 3. Any cost which does not contribute to value, 4. That portion of the cost of a product which does not contribute to essential functions, required performance, or marketability.

**cost, variable** — Direct or indirect costs which change directly with the quantity of, or conditions under which, products are produced, as distinguished from fixed costs.

**cost, variance** — See incremental cost.

**cost, vendor** — See supplier cost.

**dollars, constant** — Economic value expressed in terms of the purchasing power of the dollar in the base year; i.e. both inflation of cost and the time value of money are reflected through use of a discount rate.

**dollars, current** — Economic value expressed in terms of actual prices each year, including inflation: i.e. present or future value of current dollars is determined by using the time value of money rather than a discount rate.

**engineer, value** — One who uses value engineering methodology to study a product and search for value improvement.

**engineering, value** — 1. The same as value analysis except with emphasis on application during product development and/or design, 2. The incorporation of functions onto products considered of value by the user

**estimate, cost** — 1. A product representing the art and science of predicting cost or price. 2. The summation of unit quantities of labor and material multiplied by unit costs of labor, material, overhead, and profit for providing a product under a specified set of conditions.

**factor, discount** — A multiplication number for converting cost and benefits occurring at different times to a common basis.

**FAST, customer** — The same as Technical FAST diagram except: the same four supporting functions (i.e. assure dependability, assure convenience, satisfy user, attract user) always appear immediately to the right of the left scope line.

**FAST, technical** — 1. A diagramming technique to graphically show the logical relationships of the functions of a product, 2. Product functions displayed horizontally in diagram form using the following rules: higher order functions appear to the left

answering "why" a function occurs: lower order functions appear to the right answering "how" a function occurs; functions occurring at the same time appear vertically below one another; scope lines indicating the scope of the value study are placed vertically; and basic function of the product is defined as being immediately to the right of the left scope line.

**function, aesthetic** — 1. A function describing esteem value rather than use value, 2. A function attributable to pleasing user rather than contributing performance. 3. A function that indicates product features that exceed its technical utility or performance requirement, 4. Also referred to as esteem value.

**function, basic** — 1. That which is essential to the performance of a user function, 2. The function describing the primary utilitarian characteristic of a product to fulfill a user requirement, 3. Also called primary or essential function.

**function, critical** — A combination of the basic and selected required secondary or dependent functions defining the means used to achieve workability of the product.

**function, critical path** — One of the set of basic and dependent functions that meet the "how" and "why" logic on a FAST diagram forming a path of essential function without which the product would not perform.

**function, dependent** — 1. Lower order functions, to the right of each other on a FAST diagram, that are successively dependent on the one in its immediate left for its existence, 2. A function that depends on a higher order function for its existence, 3. A function which exists or is chosen in order to achieve a basic function,

**function, essential** — 1. A function describing a characteristic which is absolutely necessary to a product's ability to perform the user function, 2. Also called the necessary or required function.

**function, esteem** — See aesthetic function.

**function, higher order** — 1. A function which is a goal rather than an objective, or an objective rather than a task, 2. A function that is more abstract than specific (i.e. "feed people" is a higher order function than "distribute food stamps").

**function, independent** — 1. A function that does not depend on another function or on the method selected to perform that function, 2. A function that occurs "all the time," [i.e.; a pan or assembly may have to "resist corrosion" regardless of what other basic or secondary function that part is performing.

**function, lower order** — The opposite of a higher order function [tasks rather than objectives, specific rather than abstract.]

**function, necessary** — See essential function.

**function, non-essential** — See unnecessary function.

**function, primary** — See basic or essential function.

**function, required** — See essential function.

**function, secondary** — 1. A function which occupies a subordinate or auxiliary position, 2. A function indicating quality, dependability, performance, convenience, attractiveness, and general satisfaction beyond that needed to satisfy minimum user needs, 3. Includes supporting unwanted, unnecessary, and required functions.

**functions, required secondary** — A secondary function that is essential to support the performance of the basic function, 2. A function that may result from specified design criteria.

**function, sell** — 1. A function that provides primarily esteem value [such as "improve style" or "enhance decor"], 2. A function that may result from specified design criteria.

**function, supporting** — 1. A function required by the user to make a product sell, 2. A function that increases acceptance, 3. A function to assure dependability, assure convenience, satisfy user, or attract user, 4. Also called a sell function.

**function, task** — See user function.

**function, use** — See work function.

**function, user** — 1. That function performed by a product that causes its purchase by a user, 2. The function performed by an employee for the company, 3. Also referred to as a task function.

**function, unnecessary** — 1. A function not contributing to the utility or desirability of the product, 2. Also referred to as a non-essential function.

**function, unwanted** — 1. A negative function caused by the method used to achieve the basic function, [i.e.; such as heat generated from lighting which often must be cooled], 2. Also called an undesirable function.

**function, work** — 1. A function which is essential to make the product or service perform as intended, 2. A function that provides use value, 3. Also called use function.

**improvement, value** — The same as value analysis except with the emphasis on application to improve existing products.

**index, value** — 1. The monetary relationship of function worth to function cost [expressed as  $VI=FW/FC$ ] where VI is never greater than unity, [e.g.;  $VI=0.79$ ], 2. Sometimes expressed as function cost [ $VI3=FB/FC$ ].

**investment, return on** — In value analysis, the ratio of the dollars saved versus the cost of performing and implementing the study [normally expressed similar to the following;  $ROI=8:1$ ].

**life, design** — The period of time intended by the designer for product use; under expected levels of use, maintenance and repair, before product, disposal and/or replacement.

**life, product** — The period of time product is actually used, maintained and/or repaired before being taken out of service.

**life, useful** — the period of time of needed use by the customer for a product.

**life, economic** — 1. That period of time over which an investment is considered to be the lowest cost alternative for satisfying a specific need ) The period of time used to justify obtaining a product from a financial standpoint as reflected by a contract period, lease, mortgage, loan agreement, statutory limitation, warranty, depreciation, method, etc.

**management, value** — The same as value analysis except with emphasis on application as a management technique.

**methodology, value** — 1. A method for enhancing product value by improving the relationship of worth to cost through the study of function, 2. A methodology using an organized approach [job plan] with an organized effort [multidiscipline team] to provide required functions at lowest overall cost consistent with achieving required acceptance or performance, 3. Also sometimes called value analysis, value engineering, value planning, or value management.

**mismatch, value** — When function cost does not fit or match user/customer function attitude for a given function.

**model, cost** — 1. A diagrammatic representation of cost based on a hierarchical structure [often work breakdown structure] of product components or functions, 2. A model which sums to the total cost of the product.

**model, energy** — 1. A diagrammatic representation, in a hierarchical structure, of the quantity of energy consumption caused by each of the product's components or functions, 2. A model which sums to the total energy used by a product.

**model, LCC** — 1. A diagrammatic representation, in a hierarchical structure, of the present worth or annualized expenditures relating to a product for a specified period of time, 2. A model which sums to the total life cycle Cost for a product.

**model, space** - 1. A diagrammatic representation, in a hierarchal structure, of the square foot (or other unit of measure of area or space allocated to each component of a facility, 2. A model which sums to the total amount of area or space in a building.

**model, time** — 1. A diagrammatic representation, in a linear form, of the duration to perform all tasks associated with obtaining a product, 2. A model which sums to the total length of time to obtain a product and accounts for overlapping time/s of concurrent effort [i.e.; a PERT chart].

**model, worth** — 1. A second set of numbers, in the same units of measure, superimposed on the same format used for a cost model, energy model, LCC model, space model, or time model which represent the worth of that model element, 2. A model which sums to the total worth of a product for the resource measured.

**objective, value** — 1. The same or necessary performance or acceptance at lower cost, 2. Better performance at the same cost, or at a higher cost if a greater market share is thereby obtainable.

**ownership, cost of** — See life cycle cost.

**period, study** — The same as life span.

**plan, job** — A sequential approach for conducting a value study, normally consisting of at least an information step and/or function analysis step, review or implementation step, and an optional follow-up or measurement step.

**planning, value** — The same as value analysis except with emphasis on application to strategic directions of new product development, organization strategic planning, or filling market niches.

**prevention cost** — The elimination of unnecessary cost during the development stages of design or operations.

**price, customer** — 1. The fixed sum of money or amount of service given or required to transfer ownership of products. 2. Normally the sum of product cost plus profit.

**profit, product** — The difference between product price and cost where [price = cost + profit].

**program, value** — A stated plan or procedure that uses value methodology as its basis for optimizing total cost.

**proposal, value change** — 1. A change submitted by in-house personnel to improve the value of a product. 2. Also called a value engineering proposal (VEP).

**proposal, value engineering** — 1. The same as a value study proposal, 2. See also value change proposal.

**proposal, value engineering change (VECP)** — A change submitted by a Contractor, pursuant to a Contract provision, for the purpose of reducing the Contract price or life cycle cost of the product under contract.

**proposal, value study** — A recommendation, resulting from utilizing value methodology, to change a product so as to achieve greater value and/or reduce overall cost.

**quality, required** — The minimal level of product performance necessary to satisfy the customer (not to be confused with the word value).

**rate, discount** — The rate of interest reflecting inflation and the time value of money that is used in the discount formula to convert costs and benefits occurring at different times to a common time.

**technology, value** — 1. The term used in the science or art of applying value methodology, 2. The specific method or process of value analysis for handling a cost problem.

**value, aesthetic** — See esteem value.

**value, annual** — Past or future costs or benefits expressed as an equivalent uniform annual amount, taking into account the time value of money.

**value, cost** — Archaic, see use value.

**value, economic** — 1. The relationship of benefits (utility) to cost as seen by the user, 2. The life cycle benefits as related to the Cost of ownership, use, and disposal of a product, 3. Its Components are use value, esteem value, and exchange value.

**value, esteem** — 1. The monetary sum a user is willing to pay for functions providing prestige, appearance, and/or other non-quantifiable benefits, 2. The relative value a user places on the aesthetic functions provided by a product, 3. The monetary measure of the functions of a product which contribute to its desirability or salability but not its required functional performance, 4. The motivated desire to possess for the sake of possession. 5. Also referred to as aesthetic value.

**value, exchange** — 1. The monetary sum for which a product can be traded, 2. The market value of a product at a given point in time.

**value, function** — 1. The relationship of function worth to function cost, 2. See also value index.

**value, future** — The equivalent value at a specified time in the future of estimated recurring and replacement costs expected during the life of the product.

**value, good** — 1. That which occurs when a product has reasonable cost and desired performance as determined by the user, 2. The lowest life cycle Cost to reliably accomplish a function, 3. A relative economic comparator as determined by the user and measured by profit and sales.

**value, market** — The sale price of a product under the voluntary conditions of a willing buyer and a willing seller.

**value, maximum** — The lowest life cycle cost to reliably accomplish the minimum required performance.

**value, perceived** — The user's view of benefits received and the price of acquiring the product.

**value, poor** — The condition which occurs when function cost exceeds function worth by a significant amount.

**value, present** — The economic procedure to account for the time equivalent value of past, present, or future costs at the beginning of a base period.

**value, product** — 1. The relationship of benefits to cost which conforms to a user's wants and resources in a given situation, 2. A specific combination of use, esteem, market, and exchange values.

**value, salvage** — 1. The residual value of a product, net of disposal Costs, that may derive from removal or replacement of the product during the study period, 2. Also the residual value from the sale of the product during or after the study period.

**value, use** — 1. The monetary measure of the functional properties of a product which reliably accomplishes a user's needs, 2. The life cycle cost (worth to cost relationship) considering user function only.

**visibility, cost** — 1. The display of all costs for a product in one format at one time, 2. The breaking down and identification of costs hidden through aggregation, 3. Obtained through use of a cost model.

**workshop, approved VE** — A workshop approved by SAVE International for meeting the minimum training requirements to count as credit toward becoming a certified value specialist (CVS).

**workshop, VE** — A group meeting to carry on the work of conducting a value study of a product.

**worth, function** — 1. The lowest overall cost that is required to perform a function, 2. The least cost attainable through the use of a functional equivalent, 3. The cost of a function without regard to the consequences of failure, 4. Referred to as the value of a function in some texts [not a preferred usage].

**worth, present** — See value, present.

**year, base** — The year to which all future and past costs are converted when the present value method is used.

## APPENDIX

### Reference Materials

Publications Catalog, SAVE International

Describes textbooks and educational materials on the Value Methodology and related programs. Includes videotapes and information on Value World, the technical journal of SAVE International.

Annual Conference Proceedings SAVE International

Includes all presentations given at each annual conference. Also available are a VM Bibliography a compilation of all presentations since 1980, and articles from Value World. Each entry shows Title, Author, Abstract and Source. Papers can be individually ordered from SAVE International.

"Standard Practice for Performing Value Analysis (VA) of Buildings and Building Systems", American Society for Testing and Materials. Publication E-1699-95.

Value Methodology Certification Manuals, SAVE International

Certification Manual

Recertification Manual

Seminar/Workshop Manual

Certification Examination Study Guide

SAVE International Internet Web Site: <http://www.value-eng.com>

## AMENDMENT

This standard is a living document. It is expected that as members and other practitioners of the Value Methodology become familiar with its contents, amendments may be recommended. The process for such amendment is shown below:

Proposed changes to the standard may be made by anyone. They should be sent to SAVE International headquarters in the form of: 1) a marked-up copy of the VM standard showing what and how a specific portion could be changes, and 2) a narrative justification for each proposed change.

Submitted changes will be evaluated by a committee appointed by the President of SAVE International. Approved changes will be implemented on a schedule to be established by that committee.