SAVE International

Certification Examination Study Guide

This document supersedes all previous documents issued.
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Introduction

This study guide is written to assist Certification candidates in preparing for their written examination. It is intended to assist candidates discover where their knowledge of the value methodology (VM) and its applications need to be strengthened. This guide includes the body of knowledge and the glossary of VM terms as currently found in the Value Methodology Standard. The material taught in the Module I Workshop and the Module II Seminar Courses closely parallels this body of knowledge . How well you do on the Certification examination is a reflection on both you, your course instructors and your advisor. The glossary of terms in the VM Standard are new in a few basic ways that will need some adjustment, with time, to be included in our day-to-day vocabulary. The examination however, as an encouragement to the use of standard terms, will follow the definitions listed in the Standard.

Certification examinations are given each year preceding the SAVE International Annual Conference. At other times, candidates may arrange to have the examination proctored locally by an individual approved by the Certification Board. The details of arranging for a proctored examination are described in the Certification Manual.

Examination Objectives

The certification examination is designed to test the candidate's knowledge of fundamental VM concepts through the use of a variety of question formats. Candidates for the different levels of certification (AVS, VMP, or CVS) will find themselves being asked questions appropriate to that level of certification (See Figure 1). In addition, the essay portion of the examination for CVS candidates tests the ability to articulate comprehensive VM knowledge in response to a particular question. This is intended to measure effective communication abilities as well as a knowledge of VM.

Exam Category	AVS	VMP	CVS
Part I. Fundamentals 50 questions True or False	100 points 30 minutes	100 points 30 minutes	100 points 30 minutes
Part II. Work Problem Identify and classify functions, analyze function, and cost/worth	100 points 30 minutes	100 points 30 minutes	100 points 30 minutes
Part III. FAST Draw a FAST diagram for the above work problem	100 points 30 minutes	100 points 30 minutes	100 points 30 minutes
Part IV. Team Building 25 questions True or False	Not Applicable	100 points 30 minutes	100 points 30 minutes
Part V. Certification 20 questions True or False	Not Applicable	Not Applicable	100 points 15 minutes
Part VI. Financial Identify VM opportunities, first costs, annual costs, and break-even point	Not Applicable	Not Applicable	100 points 30 minutes
Part VII. Essay Choose topic and prepare essay demonstrating VM principles	Not Applicable	Not Applicable	100 points 45 minutes
Total Exam Time	1 1/2 hours	2 hours	3 1/2 hours
Score to pass: 70 % 70% achievement is required for **each** category. Grades will not be averaged.			

Figure 1 Examination Matrix

Examination Requirements

Figure 1. shows that each of the three levels of Certification have different examinations. The AVS candidate is required to take the first three parts; the VMP candidate the first four parts, and the CVS candidate all seven parts. Each part is graded separately on the basis of 100 points. A minimum of 70 per cent is required to successfully pass each part. Candidates will be required to retake only those parts failed. Reexaminations can be taken at the candidate's discretion, not to exceed 90 days from the previous examination. However, the policy is that no more than two reexaminations will be allowed. A CVS candidate who is currently certified as an AVS or VMP is required to take only those sections of the examination not previously completed.

Completion times shown in the individual parts of the examinations are shown only as a guide. The candidate may allocate time as required to each part so long as the examination is completed in the total allowed time.

Preparation for Examination

Part I. Fundamentals - The fifty (50) true or false questions test your comprehension of the history of the value methodology, including the job plan, function analysis, FAST diagramming, function cost, function worth, creativity, evaluation techniques, implementation techniques. There also are questions concerning program management and certification program requirements.

Sources:

1. Review text materials from Module I and Module II courses.
2. Review the Certification Manual and the Workshop/Seminar Manual and this Advisor's Guide.

Part II. Work Problem - The work problem requires the candidate to express the common object illustrated in function terms; classify the functions as basic, secondary and higher order functions, allocate costs to functions, identify worth corresponding to the function costs and calculate the corresponding value indices.

Sources:

1. Review Module I function analysis text materials and exercises.
2. Practice with your advisor to gain proficiency. Strive to use action verbs and measurable nouns.

Part III. FAST Diagramming - You will be asked to prepare a FAST diagram using the functions identified in the work problem in Part II**. This is the most frequently failed part of the examination.** One major reason for failure is that the functions prepared for the work problem are inadequate to produce a FAST diagram that tracks logically in both the How and Why directions. One of the reasons for preparing a FAST diagram is to add, modify or combine functions so as to better portray the product, system or procedure in logical functions. 50% of the FAST diagram grading is on logic. Work with the functions, changing them if necessary, until the logic is meaningful. The balance of the grade is on the placement of functions, and identifying the diagram parts by labeling them. Be sure the elements of the FAST diagram you are using are labeled. Identify the type of FAST diagram, whether it is classical, technical or customer/task.

Sources:

1. Review Module I and Module II texts and class exercises.
2. Practice with your advisor, using all three (3) types.
3. Learn the labeling by studying the material in Appendix B.

Part IV. Team Building - This part of the examination has been added recently by the Certification Board in recognition of the vital role that it plays in successful VM studies and implementation of value proposals. The twenty five (25) questions are aimed at testing your knowledge of attributes of team members, team dynamics, consensus building, habits and attitudes, roadblocks to creativity, and making an effective presentation.

Sources:

1. Review text materials from Module I and Module II courses.
2. View the video tape, "The Business of Paradigms" by Joel Barker.

3. "Contemporary Value Management Leadership Characteristics", R.A. Fraser, Ph.D, 1996 SAVE International Proceedings
4. “Using Function Analysis to Give Criticism and Influence the Behavior of Teams”, Rea Gorin Cook, CCC, CTM, 1997 SAVE International Proceedings

Part V. Certification Program - These twenty(20) questions are aimed at testing your understanding of the general requirements for certification, recertification, workshops and seminars.

Source:

1. Review the Certification Manual, Recertification Manual and Workshop/Seminar Manual and Advisor’s Guide.

Part VI. Financial - Currently there are two sets of questions. One set (eight questions) addresses industrial financial analysis. These questions test categorizing costs, calculate VM study costs and returns, prioritizing value objectives using calculated value indices and break-even analysis.
The second set (four questions) addresses construction financial analysis. These questions test categorizing contractor costs, calculate VM study costs and returns, prioritizing value objectives using calculated value indices, life cycle costs and break-even analysis.

Source:

1. Review Module II text and class exercises.

Part VII. Essay - The candidate is asked to prepare an essay on one of seven(7) VM questions. As an aide is preparing for this question, the criteria used in grading the question is:

Content Relevance (60%) - Has the essay demonstrated a comprehensive knowledge of the subject?
Ingenuity of Presentation (20%) - Has the essay presented the material in an interesting format that will inspire the reader?
Clarity of Presentation (20%) - Has the essay presented the material logically and in an easily understood order?

Sources:

1. Read a text on creative writing and prepare several essays relating to the unique concepts of the value methodology.
2. Review Appendix C: “What is an Essay?”. **(Note: Appendix C is not yet available electronically. Please contact the Administrator or your advisor so that you may receive a copy.)**

Comprehensive Review

While there are number of extremely valuable texts available in the Value Methodology, the one that stands out for covering all aspects of VM is Don Parker’s text, “Value Engineering Theory” (B110 in the Publications Catalogue) and the companion, “Instructor’s Guide for Value Engineering Theory Course” (B111). It provides not only a comprehensive text , but it will furnish excellent review questions and answers for each of it's 11 basic lectures.

In addition, there are several other texts that will be valuable in understanding the value methodology and passing the examination:

"Value Engineering for the Practitioner" by J. Jerry Kaufman (B109 in the Publications Catalogue) is aimed at productivity improvements by increasing the value of products and services to the markets and communities.

A third one to consider is Ted Fowler's book, "Value Analysis in Design"(B108 B109 in the Publications Catalogue. Ted's focus is on how modern methods emphasize customer needs to prevent product denigration by inappropriate cost reduction.

If you want to search for specific aspects of the value methodology, the "Value Engineering Bibliography 1980-1994"(B115 in the Publications Catalogue) will suit this purpose.

Body of Knowledge

Fundamental Value Concepts

VM History and Characteristic
- Historical development of the Value Methodology
- Types of value
- Relation of quality and value
- Primary VM questions (six) What is it? What does it do? Etc.
- Fundamental value principles and methods
- Differentiating the Value Methodology from other methods

Job Plans
- Three major stages and individual Job Plan phases
- Objectives of each stage and Job Plan phase
- Variations of Job Plans
- What the VM team does during each phase of the Job Plan

Function Analysis Basics
- Defining functions
- Classifying functions

Function/Cost
- Purpose
- Allocating costs to functions
- Pareto Analysis
- Cost models vs. function-cost models

Function Worth
- Cost-value relationship
- Good and poor value functions
  - Value index
  - Customer input
  - High cost and low cost functions
- Establish worth of functions

Creativity and Creative Processes
- Creating by function
- Techniques to help generate ideas

Defining Functions
- Verb-Noun language
- Higher orders of abstraction

Classifying Functions
- Basic function
- Secondary or supporting functions
- Higher order function
- Assumed function

Allocating Costs to Functions

Determining the Value Index
- Relationships of Function Worth and Function Cost
- Good value and poor value

Function Modeling
- Basic types
- Hierarchy models
- Function Analysis System Technique (FAST)
  - "Classic'
  - Technical
  - Customer/User
- Characteristics and Construction of FAST Diagrams
  - Scope lines
  - How? - Why? Logic
  - Elements of a FAST diagram
  - Good relational logic paths of functions
  - Critical path of functions where applicable
  - Placement of design objectives where applicable
- Allocating costs and other measures on function models

Financial Analysis
- Cost estimating/control systems
  - Direct and indirect costs
  - Fixed and variable costs
  - Financial impact of VM proposals
  - VM's relationship to and use of financial systems
  - Contracting for Value services
    - VM team
    - Designers, architects, etc.
    - Support personnel
- Contracting for Value Methodology
  - Calculating net savings
  - Sharing incentives
  - Types of clauses/contracts used in public and private sectors
- Breakeven Analysis
- Life Cycle Cost Analysis
- Value Studies
  - Net and gross costs
  - Return of study cost
  - Implementation & programmed costs

Management of Value

Organizing and implementing VM programs
Management's role
Value team composition
Team leader skills
Managing VM teams and studies

Value Analysis Education

Basic Value Analysis Education
- Module I training workshop content
- Module II seminar content

Related Programs

Appendix A - Glossary

COST
The expenditure necessary to produce a product, service, process or structure.

COST, DESIGN TO
A procedure which establishes an estimated cost objective for each project. Then designs to that cost objective to produce a reliable product or service.

COST. LIFE CYCLE
The sum of all acquisition, production, operation, maintenance, use and disposal costs over a specified period of time.

COST MODEL
A diagramming technique used to illustrate the total cost of families of systems or parts within a total complex system or structure.

COST/WORTH RATIO
The ratio used to determine the maximum opportunity for value improvement.

FUNCTION
The natural or characteristic action performed by a product or service.

FUNCTION, BASIC
The primary purpose or most important action performed by a product or service. The basic function must always exist, although methods or designs to achieve it may vary.

FUNCTION SECONDARY
A function that supports the basic function and results from the specific design approach to achieve the basic function As methods or design approaches to achieve the basic function are changed, secondary functions may also change. There are four kinds of secondary functions:

- Required - A Secondary function that is essential to support the performance of the basic function under the current design approach.
- Aesthetic - A secondary function describing esteem value.
- Unwanted - A negative function caused by the method used to achieve the basic function such as the heat generated from a light bulb, which must be cooled.
- Sell - A function that provides primarily esteem value. For marketing studies it may be the basic function.

FUNCTION MODEL
A graphical depiction of the relationships of the functions within a project. There are two commonly used styles:

- Hierarchy - A vertical "tree" chart of functions. Recent practice has been to include within one branch user oriented functions such as assure convenience, assure dependability, enhance function, and please senses. Some practitioners prefer to lay out this model horizontally and refer to it as "user FAST".

- Function Analysis System Technique (FAST) - A horizontal chart depicting functions within a project with the following rules:
    1. The sequence of functions on the critical path proceeding from left to right answer the questions, "How is the function to its immediate left performed?"
    2. The sequence of functions on the critical path proceeding from right to left answers the question "Why is the next function performed?"

3. Functions occurring at the same time or caused by functions on the critical path appear vertically below the critical path function
4. The basic function of the study is always farthest to the left of the diagram of all functions within the scope of the study.
5. Two other functions are classified:

Highest Order - The reason or purpose that the basic function exists. It answers the "why" question of the basic function, and is depicted immediately outside the study scope to the left.

Lowest Order - The function that is required to initiate the project and is depicted farthest to the right, outside the study scope. For example, if the value study concerns an electrical device. The "supply power" function at the electrical connection would be the lowest order function.

JOB PLAN
A structured discipline to carry out a value study.

PERFORMANCE
The physical characteristics meeting the users needs. Factors such as reliability, maintainability, quality and appearance are typical.

PRICE
A fixed sum of money expended by the user/customer to purchase the product under study.

PRODUCT
For the purposes of value studies, a product is the subject of the study. It may be ~a physical product such as a manufactured item, or a structure, system, procedure, or an organization.

SCOPE
The portion of the overall project selected for the value study. The analysis accepts everything within the defined scope in order to focus attention on the functions within those limits.

VALUE
The lowest cost to reliably provide the required functions at the desired time and place with the essential quality and other performance factors to meet user requirements,

VALUE, MONETARY
There are four classes of monetary value:

- Use Value - The monetary measure of the functional properties of the product or service which reliably accomplish a user's needs.
- Esteem Value - The monetary measure of the properties of a product or service, which contribute to it's desirability or salability. Commonly answers the "How much do I want something?" question.
- Cost Value - The monetary sum of labor, material, burden, and other elements of cost required to produce a product or service,
- Exchange Value - The monetary sum at which a product or service can be freely traded in the marketplace.

VALUE METHODOLOGY
The systematic application of recognized techniques, which identify the functions of the product or service, establish the worth of those functions, and provide the necessary functions to meet the required performance at the lowest overall cost.

VALUE METHODOLOGY PROPOSAL
A proposal by the value study team to its management to provide one or more recommendations for financial and/or performance improvements and is within the current terms and conditions of the contract.

VALUE STUDY
The application of the value methodology using the VM job Plan, and people previously trained in VM workshops.

VALUE METHODOLOGY TRAINING
There are two levels of SAVE International approved training specifically designed to provide the minimum knowledge. of VM practice. It is expected that VM professionals, as in all professional fields, will continue to keep themselves current through seminars, conferences, and associated educational opportunities:

- Value Methodology Workshop The objective is to provide Value Methodology education to the degree that participants will be able to successfully participate in future value studies under the guidance of a qualified Value Specialist with minimum additional training. This is called the Module I program.
- Value Methodology Advanced Seminar - The objective of this seminar is to extend the knowledge base of those wishing to become professionals in the value methodology field. Topics include both advanced methodology and areas of management. This seminar is referred to as the Module II program. The seminar requires a minimum of 24 class hours. Module I is a prerequisite., and it is expected attendees will have enough practical experience in VM to contribute to the seminar,

VALUE ANALYST
Synonymous with Value Specialist.

VALUE ENGINEER
Synonymous with Value Specialist.

VALUE ENGINEERING CHANGE PROPOSAL (VECP)
A formal proposal submitted to the customer/user, which requires their approval before implementing the VE change. The result will be a modification to the submitter's contract,

VALUE SPECIALIST
One who applies the value methodology to study and search for value improvement.

WORTH
The lowest overall cost to perform a function without regard to criteria or codes.

Appendix B – FAST Diagramming

In Value Methodology, functions are defined with two words, a verb and a noun. This enhances specific understanding. The noun, if possible, should be measurable and thereby permit quantification for establishing worth.

EXAMPLES

Items	Activity	Function	Unit of Measure
Table	Holds Items	Support Weight	pounds
Screwdriver	Insert Screws	Transmit Torque	ft/lbs.
Electric Wire	Connect Parts	Transmit Current	amperage
Structural Beam	Hold Floor	Support weight	pounds
Report	Mail Report	Communicate Data	words

The first step is to define all the functions that the VM study team believes are involved in the project. Then functions are classified as basic or secondary. For small projects, this is a relatively easy task. For complex projects it becomes more involved and literally hundreds of function can be defined on this random basis. It was for these complex projects, that FAST diagramming was developed.

FAST (Function Analysis Svstems Technique) is a technique which specifically illustrates the relationships of all functions within a specific project utilizing a How-Why logic pattern based on intuitive logic. The original FAST is referred to as Classical FAST. The second, known as Technical FAST, was developed to separate functions occur only one time, and those "all the time" functions that are active whether the system is operative or not. These "all the time" functions are shown separately from the main function logic. The third and latest, User/Customer FAST, is always headed by four supporting functions, Assure Convenience, Satisfy User, Assure Dependability and Attract User.

The following pages illustrate the format and labeling of the three types of FAST diagrams. ***(Not currently available in electronic format. Please request faxed copy from Administrator.)***

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