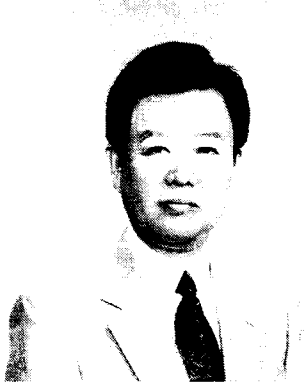


## CHARACTERISTICS OF VE STUDY & APPLICATION IN JAPAN THROUGH COMPARISON OF AMERICAN & JAPANESE CONFERENCE PAPERS

Yoshio Nakagami, CVS, Prof.

The SANNO Institute of Management, Tokyo, Japan



Yoshio Nakagami, CVS, is Professor of Production Management at The SANNO Institute of Management, and is Chief Researcher of SANNO's Management Development & Research Division. He graduated from Tokyo University of Agriculture & Technology. Since 1968, he has built his consultant career specializing in manufacturing and construction, largely in product development, product, process, method and administrative work improvements to which he has been applying VE-oriented management engineering techniques. He is a Senior Advisor for the Society of Japanese Value Engineers (SJVE), a licensed Consulting Engineer and a Member of Project Management Institute and of American Association of Cost Engineers.

### ABSTRACT

This paper specifies the typical characteristics of VE study and application as practiced in Japan. Conference presentations so far made at SAVE International's annual conferences and those presented at SJVE's annual national conferences have been comparatively analyzed and contrasted. Based on its result, the Japanese characteristics in VE study and application are clearly depicted.

### INTRODUCTION

There are constant flows of many new VE papers being published for both SAVE annual conferences and SJVE annual conferences. Many Value professionals and practitioners enthusiastically participate in presenting, listening to, and exchanging discussions on those presentations. These papers altogether should discreetly reflect typical characteristics of VE study and applications being performed in each country, as represented by the papers.

Under the purpose of clarifying how VE study and application are being done in Japan, all of VE papers so far presented at annual SJVE conferences have been comparatively analyzed against those published for annual SAVE International conferences. Based on the result, this paper realistically reveals the Japanese characteristics and trends in VE study and application.

So as to avoid possible misunderstanding, the term "VE" used throughout this presentation is defined as practical research and development for VE application.

### OUTLINE OF THE SURVEY

#### Survey Samples Used

Two sample groups were used for comparative analysis in the survey: 1) SJVE conference presentations (in the form of papers and case reports) published in the annual proceedings from 1968 through 1995, and 2) VE papers so far presented and published by American speakers in their annual SAVE International conferences from 1966 through 1995. Specifically, the Japanese group represents all VE papers published ever since the first annual SJVE conference held in 1968, and the American papers are those published in SAVE's annual conference proceedings since 1965. In that year, SJVE was organized and it started obtaining proceedings copies. So that the analysis can be purely focused on US-Japan comparison, VE papers from countries other than the USA and Japan were not covered in the survey.

#### Description of the Survey

Specific contents of those papers covered in the survey were analyzed for the purpose of clarifying 1) What areas of VE study have been considered to be important, and 2) To what types of projects VE has been mainly applied.

#### 1. Categories for Contents Analysis:

The following seven categories were used for

grouping those Japanese and American presentations covered by the survey.

Category 1: Management for VE application

Category 2: Specific Application of VE

Category 3: Technical Factors in VE Application

Category 4: Human Factors in VE Application

Category 5: Promotion & Enlightenment for VE Application

Category 6: VE-centered Survey Reports

Category 7: VE Application on the Part of Government /Public Circles

**2. The Process of Contents Analysis:**

The first step of analysis was to sort out all of the presentations by the established categories.

The next step was to select Japanese presentations that showed higher survey ratios for further sub-grouping and detail analysis.

The final step was to compare the contents of those selected presentations with those of American papers so that characteristics of VE study and application can be revealed by contrast.

**DESCRIPTION OF SURVEY RESULTS**

**Survey Coverage of Presentations**

Among the overall total of 600 SJVE conference presentations, 575 or 95.5% were Japanese papers. Among the total of 1,074 SAVE conference presentations, 890 or 82.9% represented American papers.

Table 1 shows the result of analysis by the established seven categories.

The table shows that Japanese presentations under Category "Specific Application of VE" topped the list at 61.8% with 355 papers. The second in the list was 27.5% with 157 papers under Category "Technical Factors in VE Application." Evidently, Japanese presentations under these two categories dominated with a total of 90%, a unique phenomenon of concentration.

Meanwhile, American presentations were topped by 237 papers at 26.4% under "Technical Factors in VE Application," rather evenly followed by 19.8% (174) under

"Specific Application of VE," 13.9%(124) under "Promotion & Enlightenment" and 13.8% (123) under "Government/Public Circle VE Application."

**Table 1: The breakdown of Japanese and American papers by survey categories**

Category	SJVE	SAVE
1.Management of VE application	42(7.3%)	88(9.8%)
2.Specific application of VE	355(61.8%)	174(19.8%)
3.Technical factors in VE application	157(27.5%)	237(26.4%)
4.Human factors in VE application	12(1.9%)	77(8.7%)
5.Promotion & enlightenment for VE application	0	124(13.9%)
6.VE-oriented survey reports	3(0.5%)	7(0.8%)
7.VE application on the part of Government Public Circles	0	123(13.8%)
8.Others	6(1.0%)	60(6.8%)
Total selected	575(100%)	890(100%)

**Detail Analysis of Papers**

Contents of the papers presented under the four selected categories (i.e., among those under the seven established categories), "Management for VE Application," "Specific VE Application," "Technical Factors in VE Application" and "Human Factors in VE Application," were analyzed in depth. There were 566 Japanese papers (98.5%) and 576 American papers (64.7%) coming under these categories.

**1. Management for VE Application**

Presentations under this category deal with major subject related to managing the utilization of VE. Such subjects can be grouped as shown in Table 2. It shows a breakdown of the numbers and percentages of related presentations.

Japanese papers under the subject "Planning & follow-through of VE application" come on top of the SJVE list, with those under three other subjects showing small percentages and those under the remaining two subjects with no papers. Meanwhile, American papers under the two subjects "Planning & follow-through of VE application" and "Organizing VE application" show higher percentages.

**Table 2: The detailed breakdown by specific subjects under Category 1**

Subject	SJVE	SAVE
Planning & follow-through of VE application	24(4.2%)	30(5.2%)
Organizational introduction & stabilization of VE	6(1.1%)	6(1.1%)
Organized VE application	5(0.9%)	26(4.5%)
Improving methods of VE application	3(0.5%)	10(1.7%)
Top management support & participation in VE	0	4(0.7%)
VE necessities by management	0	3(0.5%)
Others	4(0.7%)	9(1.6%)
<b>Selected sub-total</b>	<b>42(7.4%)</b>	<b>88(15.3%)</b>
<b>Total analyzed</b>	<b>566(100%)</b>	<b>576(100%)</b>

It should be noted here that the majority of the authors of those Japanese VE papers are in-house Value practitioners (i.e., rather than independent consultants) working within SJVE's member companies. Top executives in these companies tend to be interested in VE, endeavoring to support and promote VE company-wide. Under such circumstances, in-house VE practitioners' professional enthusiasm seems to be concentrated on how their VE application should be best planned and how the specific VE alternatives proposed by their VE teams should be best followed through toward their actual implementation.

**2. Specific VE Application**

Presentations under this category were divided into six subject areas, and the results are shown in Table 3.

The Japanese ratio for "Case Reports on VE Application" is remarkably high with a "stand-alone number" of 208(36.7%). "Case Reports" here can be defined as presentations reporting on the actual process and results of the application of the VE Job Plan and techniques to specific projects.

The biggest factor for bringing up the number of case reports so high is SJVE's policy to encourage active presentation of specific case stories of successful VE application, and such presentations have been published as a separate volume of SJVE conference proceedings. Largely, these case reports have been found helpful in verifying the validity of VE application and also in suggesting possibilities for wider application in new types of projects as such.

**Table 3: The detailed breakdown by specific subjects under Category 2**

Subject area	SJVE	SAVE
Case reports on VE application	208(36.7%)	39(6.8%)
VE application methodologies for specific projects	63(11.1%)	67(11.6%)
VE application methodologies to meet specific purposes	40(7.1%)	31(5.4%)
VE application within particular organizations/companies	37(6.5%)	22(3.8%)
Application of particular techniques	7(1.2%)	14(2.4%)
VE application within particular countries	0	1(0.2%)
<b>Selected sub-total</b>	<b>355(62.7%)</b>	<b>174(30.2%)</b>
<b>Total analyzed</b>	<b>566(100%)</b>	<b>576(100%)</b>

The breakdown of those 208 case reports is as follows:

Application to:	No. of papers
Products, components and/or parts	77
Building construction projects	46
Civil engineering projects	25
Manufacturing processes	19
Overhead/administrative activities	16
Packaging	7
Others	18

Above data should reflect the general VE application trend prevailing through hardware products, construction projects, manufacturing processes and administrative procedures.

The ratios for "VE Application Methodology for Specific Study Projects" are found almost even between Japanese and Americans.

This classification can be defined as "VE application methodology to specific hardware products, buildings, material procurement procedures, administrative procedures, manufacturing processes, computer software, etc.

The breakdown of the 63 presentations (Table 3) is as follows:

Application to:	No. of papers
Administrative procedures	20
Construction work methods	15
Products, components, etc.	10
Manufacturing processes & methods	5
Building structures	4
Construction structures	2
Computer software	2

The ratios for “VE Application Methodology to Meet Specific Purposes” are again found to be pretty close between SAVE and SJVE. “VE Methodology to Meet Specific Purposes” can be defined as VE application methodologies to such specific purposes as product improvement, cost reduction, standardization, energy conservation, etc.

Major themes of presentations among the 40 papers were as follows:

Application to:	No. of papers
Product improvement	11
Product planning	5
Standardization	3
Environment protection	3
Operational improvement	3
Manufacturing processes/methods	2

The data in these tables under the category of “Specific VE Application” seem to conclude that of VE application studies are mainly directed to administrative procedures and construction project work., and that VE application in such upstream phases as product development and planning has been emphasized.

### 3. Technical Factors for VE Application

Presentations under this category were divided into five subject areas, the result of which is shown in Table 4.

For SAVE, “Specific Techniques for Job Plan Execution” was highest with 86(14.9%), followed by “VE-based Problem-solving Approaches, ” “VE-related Engineering Techniques” and two other subjects. For SJVE, “Specific Techniques for Job Plan Execution” was highest with 101(17.8%), but Japanese presentations on the last three subjects were found to be notably few in numbers.

**Table 4: The detailed breakdown by specific subjects under Category 3**

Subject area	SJVE	SAVE
Specific techniques for doing VE job plan	101(17.8%)	86(14.9%)
VE-based problem-solving approaches	44(7.8%)	55(9.5%)
VE-related engineering approaches	6(1.1%)	47(8.2%)
VE-oriented concepts & theories	5(0.9%)	24(4.2%)
Relations between VE & other engineering techniques	1(0.2%)	25(4.3%)
Selected sub-total	157(27.8%)	237(41.1%)
Total analyzed	566(100%)	576(100%)

The SJVE standard Job Plan is divided into the following three phases.

- a. *Function Definition Phase* : This phase covers collection of necessary information on the selected specific project, define specific functions of all elements of the project, and come up with functional diagrams.
- b. *Function Evaluation Phase* : In this phase the related cost data are analyzed by functions, establishing their worth, so that the specific value levels can be evaluated.
- c. *Alternatives Development Phase* : This phase consists of the steps of creating ideas, evaluating them and refining them for feasibility so as to come up with alternative proposals for implementation.

SJVE presentations dealing with the subject of “Specific Techniques for Job Plan Execution” by the above three phases can be evenly broken down as 36, 31, and 34, respectively. This reflects a trend of Japanese VE covering each and all steps of the VE Job Plan aimed at its more effective use.

### 4. Human Factors for VE Application:

Presentations under this category were grouped into the following six subject areas, and the result of analysis is shown in Table 5.

**Table 5: The detailed breakdown by specific subjects under Category 4**

Subject area	SJVE	SAVE
VE training	7(1.2%)	29(5.0%)
Professional competence	3(0.5%)	9(1.6%)
Motivation	2(0.4%)	8(1.4%)
Team Working Potential	0	8(1.4%)
Communication skills	0	5(0.9%)
Attitudes toward VE	0	5(0.9%)
Others	0	13(2.2%)
Selected sub-total	12(2.1%)	77(13.4%)
Total analyzed	566(100%)	576(100%)

American presentations under this category are topped by 29(5.0%) in the area of "VE Training," followed by 9(1.6%) in "Professional Competence" and those in five other areas.

It is notable that Japanese presentations under this category tend to be much fewer, as compared to American counterparts. Yet, the area of "VE Training" attracts Japanese interest with 7(1.2%), indicating the felt necessity for more human resources to be skilled in using VE methodologies. Their majority interest is focused on VE training programs, training techniques, etc.

**CHARACTERISTICS OF VE STUDY AND APPLICATION**

The result of subject survey seems to clarify that VE study and use in Japan can be generally characterized as follows:

1. VE study and application has been dominated by private industries

Ever since VE was introduced to Japan in the 1950's, private manufacturing and other corporations, based on their felt need for VE and on recognizing the effectiveness of VE, have taken the initiatives to adopt it positively. Meanwhile, very few Japanese government and semi-governmental circles have taken, until very recently, their keen interest in VE application. Thus, VE study and application have been dominantly and positively made among various private corporations.

2. The principal area of VE study has had its focus on Technical Factors for VE Application

In VE application, private corporations have taken up a wide variety of study projects ranging from various types

of hardware products, construction projects to many aspects of work operations. Also, the coverage of application widely deals with phases of product planning, designing through actual production and phases of construction projects, etc. Thus, VE practitioners' constant need has been to find answers to the question of how best VE can be and/or should be applied to such wide varieties of study projects as well as application phases, bearing on the pursuit of "Technical Factors for VE Application."

3. Emphases of VE Study

The survey result dictates that the Japanese VE practitioners' study emphasis has been largely focused on the following five topical areas:

(1) Management for better VE application to specific projects

Aimed at meeting the basic objectives or purposes related to the selected projects, such management aspects as how to plan and initiate VE application and how best it should be followed through are being considered important.

(2) VE application methods for product planning and development phases

As the VE effectiveness in the "upstream" phases of the product life cycle has become widely recognized, study emphasis has also shifted to the product planning and development phases trying to better solve the question of how best VE can be applied.

(3) VE application methods for construction projects

Compared to the manufacturing sector, construction projects are basically different in the characteristics of VE application. Thus, practitioners in this sector tend to find their own answers to the question of how best they should select specific projects and use applicable techniques.

(4) VE application methods for administrative procedures

This area too should be treated differently from VE in the manufacturing and construction sectors. Accordingly, finding best answers in this sector needs different angles in their VE study.

(5) Specific steps of the VE Job Plan needing to be refined and elaborated

Finding the standard VE Job Plan to be a powerful instrument in VE studies dealing with various types of themes,

study of the Job Plan in terms of its specific steps and application techniques has been found to be an important focus of presentations.

4. VE application emphasis on products, components and site construction projects

In the two decades' history of VE introduction to Japan, the manufacturing sector was almost a sole cradle for VE study and application, mainly focused on the hardware products and parts. When the construction sector later became positively interested in VE, it started to be mainly applied to the actual phases of site construction projects. Thus, the emphasis of VE application has shifted more closely to products, components and site construction projects.

CLOSING

It is hoped that this paper would meaningfully add to readers' knowledge and understanding of the characteristics of VE study and application in Japan as contrasted with American counterparts in a comprehensive survey analysis of both American and Japanese conference presentations.