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**PRESENT VE APPLICATIONS AND
POTENTIAL NEEDS IN THE
JAPANESE INDUSTRY**

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ABSTRACT

Based on a survey of member organizations of the Society of Japanese Value Engineers (SJVE), this paper analyzes the status quo of VE applications in the Japanese industry. The findings or phases of VE applications current emphases, shifts in VE phases and future emphases in VE applications are presented and potential needs in VE applications are discussed

INTRODUCTION

The survey was conducted by Management Development & Research Division, The Sanno Institute of Management from Nov. to Dec., 1992, using a questionnaire mailed to 385 member organizations of SJVE. One hundred ninety responses were received from the following industrial sectors:

Construction	14.2%
Process industry	10.0%
General machinery	10.5%
Electric/electronics	29.5%
Transport machinery	17.4%
Precision machinery	8.4%
Others	10.0%

FINDINGS

Present Status of VE Applications

Phases of VE Applications

The growth track of VE applications was divided into five phases. The survey examined in what phases these responding organizations were found.

Phase I (About-to-start VE):

Management considers how and when VE should be introduced.

Phase II (Introducing VE):

Starting VE application.

Phase III (Partial VE applications):

VE applications appear somewhere in the company.

Phase IV (Total VE applications):

All divisions and/or sections have participated in corporate-wide VE applications.

Phase V (Stabilizing or matured):

VE applications progressing very systematically, producing positive results.

As shown in Table 1, the highest ratio was for "Partial VE applications" (39.5%) as a whole followed by "Stabilizing or matured" (29.5%).

Table 1

**Table 1. Application Phases by Industry
(Percentage Distribution)**

Sector \ Phases	About to Start	Introducing	Partial Apply	Total Apply	Stabilizing	Total
As a Whole	4.7	5.3	39.5	20.0	29.5	100.0
Construction	16.5	11.1	29.7	14.8	22.2	100.0
Process Industry	0	0	63.2	20.3	10.5	100.0
General Machinery	5.0	10.0	45.0	15.0	25.0	100.0
Electric/electronics	1.8	1.8	33.9	19.6	42.9	100.0
Transport Machinery	0	6.1	42.4	21.2	30.3	100.0
Precision Machinery	0	12.5	56.3	18.7	12.5	100.0
Others	10.5	0	21.1	26.3	36.8	100.0

But as for sectorial ratios, phases of VE applications differ from industry to industry. "Partial VE applications" were highest in the process industry (63.2%), precision machinery (56.3%), general machinery (45.0%), transport machines and vehicles (42.4%) and construction sectors (29.7%). In the electric/electronics industry, "stabilizing or matured" shows the highest ratio. In the construction industry, "about-to-start VE" was higher than that of other sectors (18.5%).

In view of these findings, it can be said that phases of VE applications differ from sector to sector. In machine manufacturing including electric/electronics and transport machinery sectors, VE application ranges from "partial application" to "stabilizing or matured" phases. The process industry, is in the "partial application" to "total application."

And construction is in a variety of phases ranging from "about-to-start" to "stabilizing or matured."

Current Emphases in VE Applications

VE applications were divided into the following five areas and what phase the priority of VE effort was being placed on was studied:

- New product planning
- New product designing
- Improvement of existing products
- Improvement of manufacturing/construction processes
- Improvement of administrative processes

Table 2

Table 2 Current VE Emphasis

(Percentage Distribution)

Priority \ Areas	1	2	3	4	5	Total
New Product planning	6.3	6.8	17.9	25.3	14.2	100.0
New Product designing	34.2	29.0	16.3	6.3	0.5	100.0
Improving Existing Products	42.1	31.6	14.7	1.6	0	100.0
Improving Mfg Phase	8.4	22.1	22.1	23.7	7.4	100.0
Improving Admin. Phase	1.6	5.3	8.4	14.7	45.8	100.0

As shown in Table 2, "improvement of existing products" (42.1%) and "new product designing" (34.2%) are higher for the top priority. As for the second priority, "improvement of existing products" (31.6%) and "new product designing" (29.0%) tend to be emphasized. Taking these into account, present emphases are on those two areas.

But VE emphases also differ from industry to industry. Table 3 shows in what area the respondents placed the top priority in

employing VE. "Improvement of existing products" was highest in the general machinery (50%), process industry (42.1%) and construction industry (40.7%) while "new product designing" was highest in the precision machinery (50.0%), transport machinery (48.5%) and electric/electronics industries (44.6%). "Improvement of manufacturing/ construction processes" is higher in the construction (37.0%) and process (21.1%) industries.

Table 3

Table 3: Current VE Emphasis By Industry

(Percentage Distribution)

Sector \ Area	New Product Planning	New Product Designing	Improving Products	Improving Mfg Precision	Improving Administr. Precision
As a Whole	6.3	34.2	42.1	8.4	1.6
Construction	0	0	40.7	37.0	0
Process Industry	0	26.3	42.1	21.1	0
General Machinery	0	40.0	50.0	0	0
Electric/Electronics	8.9	44.6	41.1	3.6	0
Transport Machinery	6.1	48.5	39.4	0	0
Precision Machinery	6.3	50.0	43.8	0	0

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In the machine manufacturing including electric/ electronics and transport machinery, VE emphasis tends to be placed on improvement of existing products and new product designing. In the process industry, emphasis is placed not only on improvement of existing products but also on new product designing and improvement of manufacturing processes. In the construction industry, VE emphasis centers on improvement of

existing products and improvement of construction processes. These trends really reflect characteristics of each industry.

Shifts in VE Emphases

To have a sure grip on trends of shifts in areas for VE application, a survey on the following was conducted:

**Table 4: Shifts in VE Emphases
(percentage distribution)**

1) from improvement of existing products to new product designing	34.7
2) from improvement of existing products to new product planning	13.2
3) from improvement of existing products to improvement of manufacturing/construction phase	10.5
4) from new product designing to new product planning	10.0
5) from improvement of manufacturing/construction phase to new product designing	7.9
6) from improvement of manufacturing/construction phase to improvement of existing products	4.7
7) from improvement of existing products to improvement of administrative phase	4.2
8) from improvement of manufacturing/construction phase to improvement of administrative phase	3.1
9) from improvement of manufacturing/construction phase to new product planning	2.6
10) Others	4.7

· whether VE emphases have shifted or not in past five years.

· how they shifted during the same period.

Responses are:

· No shift	32.6%
· Small shifts	49.5%
· Sizable shifts	10.5%
· No reply	7.4%

As observed in the above, 60% of the total respondents said there were shifts in VE emphases.

Table 4 shows types of shifts in 5 VE emphases. "Shift from improvement of existing products to new product designing" was highest (34.7%), followed by shift from improvement of existing products to new product planning"(13.2%), shift from

improvement of existing products to improvement of manufacturing/ construction processes" (10.5%) and "shift from new product designing to new product planning" (10.0%).

These responses indicate that areas for VE application have shifted from:

- improvement of existing products to other areas and,
- manufacturing phase to the upstream of a product life cycle such as the designing phase.

It seems that the responses indicate the value of products should be assured at the designing phase, resulting in the prevention of any alteration in design at the manufacturing phase.

Future Emphases in VE Application

Future emphases in VE application were surveyed. Table 5 shows the results of the survey indicating respondents' priority as to which area they are going to emphasize in future.

Table 5

**Table 5: Future VE Emphasis
(Percentage Distribution)**

Priority Areas	1	2	3	4	5	Total
New Product Planning	45.3	22.1	6.3	6.8	3.7	100.0
New Product Designing	32.1	44.2	9.5	2.7	0	100.0
Improving Existing Products	8.4	10.0	33.7	20.0	12.1	100.0
Improving Mfg Phase	4.7	10.0	22.1	27.9	17.4	100.0
Improving Admin. Phase	0.5	6.3	16.8	16.8	39.6	100.0

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For the top priority, "New product planning" (45.3%) and "new product designing" (32.1%) are higher while "improvement of existing products" is lower (8.4%). For the second priority, "new product designing" (44.2%) and "new product planning" (22.1%) are higher while "improvement of existing products" is lower (10.0%).

This tendency is common to machine manufacturing sectors. Given these findings, VE emphasis will further shift from improvement of existing products in the downstream of a product life cycle to the upstream such as new product designing and planning.

These findings reflect that respondents have come to understand that they have to provide their customers with higher-value products, and that they had better employ VE in the upstream of a product life cycle so as to satisfy customers.

Whether VE is applied to manufacturing phase (downstream) for improvement of products or to planning/designing phase (upstream) for new product planning and designing, basic VE concepts and processes remain unchanged.

But VE applications in the upstream and those in the downstream differ much on the starting point of activity or input and outcome or output. In the product planning phase, for instance, the input is customers' requirements and the output is a product plan or design specifications. In the manufacturing phase, the input is a design plan or manufacturing specifications and the output is their alternatives.

To be successful in applying VE to the upstream, therefore, it is particularly important to understand basic concepts of VE accurately, have a sure grip on requirements from customers and markets in the earlier phase, and define necessary functions in accordance with such requirements.

In the actual VE applications seen in SJVE Conferences, however, many made an improvement-based approach to define functions in accordance with existing products or a design plan. Very few made a design-based approach to define necessary functions in accordance with customers' requirements.

Taking into consideration such situation and the fact that VE emphasis tends to center on the upstream of a product life cycle, future VE applications should:

- have a sure grip on customers'/market requirements and
- define necessary functions in accordance with customers' requirements

CONCLUSION

Based on the survey of member organizations of SJVE, the status quo of VE applications in the Japanese industry was analyzed and potential needs in VE applications were discussed.

As described, VE emphases have shifted from the manufacturing phase to the designing phase, they are expected to move upstream further to the planning phase in the nearer future. This means that VE practicing organizations intend to apply VE to the upstream of a product life cycle for supplying higher-value products to customers.

But to realize such VE applications, they have to have a sure grip on customers' requirements and master the methods to define necessary functions in accordance with requirements from customers.

VE application in earlier phases will be expected, resulting in the creation of higher-value products for customers.