SHORT-TIME VE TECHNIQUES AND THEIR MINDSETS DEVELOPED IN JAPAN

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Biography

Hisaya Yokota is a Certified Value Specialist both by the SAVE International, USA and by the Society of Japanese Value Engineering and also is a Professional Engineer, Japan (P.E.Jp), certified by the Institution of Professional Engineers, Japan. He has been a leading VE Consultant over the past 18 years, having promoted the application of Design-phased VE to public works projects for the Ministry of Land, Infrastructure, Transport and Tourism, the Urban Renaissance Agency, Prefectures, Cities, Towns, and Villages, etc. He has conducted approximately 90 Design-phased VE Studies, creating a total savings of about 200 billion JPY in cost reductions. In 2010, after having worked as Director of the Value Engineering Center at Pacific Consultants Company Limited, he started the Functional Approach Institute Company Limited in Tokyo where as President and Chief Executive Officer, he offers business management strategies, project consulting services, and VE education.

Kayo Uchida holds a Bachelor of Dental Science (BDS) from Tokyo Medical and Dental University, Japan. She currently works as a dental hygienist, anti-aging medicine trainer, and smile trainer. As a smile trainer, she has conducted numerous lectures and seminars throughout Japan, including the one for Ms. Universe Japan. She has also made many appearances on Japanese TV programs and in Japanese magazines – most notably, the one on the Japan Broadcasting Corporation's TV program: Magic to be beautiful. Meanwhile, as a freelance dental hygienist, she has provided consultations for dental clinics throughout Japan. At Functional Approach Institute Co. Ltd., she serves as a Functional Approach Consultant, and has applied VE to the dental industry for its improvement.

Abstract

Value engineering (VE) has gained a world-wide recognition as a superb method for improvement. This has remained true since VE was invented in 1947. At this very moment, people somewhere in the world may be benefiting from VE and improving what they want.

However, the biggest drawback with VE lies in time and labor. Still, to improve what we want, we have called on many members on duty, and have spent much time for each VE activity. This is because VE is

designed as a methodology to maximize its own effect with great time and labor. For many great years, we have taken this for granted.

Recent years have seen the new change that people have paid more attention to VE practices which can be done for a shorter period of time (Short-Time VE). In fact, Short-Time VE and its application have been frequently reported at the SAVE Value Summit and the SJVE Annual Conference in the past several years. It goes without saying that Short-Time VE has established itself as a new methodology field.

This technical paper will summarize four effective Short-Time VE techniques, which have been developed and practiced in Japan. It will further present three case studies of the latter two techniques – the authors' inventions: "4-Meeting VE" and "5-Step VE."

Key words: Short-Time VE, 4-Meeting VE, 5-Step VE

Introduction

In Japan, VE was introduced in the 1960s. During that period, Japan had experienced a remarkable economic growth: On average, its nominal GDP had grown 15 to 20 percent more than that of the previous year. This increase was largely due to expansion in the manufacturing industry. Soon after VE introduction in Japan, manufacturers realized its great effect and started applying it to themselves. Consequently, virtually all the manufacturing companies utilized VE.

Since then, Japan has had a considerably slower economic growth. Each company has promoted work efficiency, labor saving, and cost reduction in its organization. Amid this dramatic change, VE has still proven extremely effective.

Moreover, in Japan VE has recently expanded its scope of application from the manufacturing and construction industry to the service or any other industry. Not only does VE serve for engineers, but also it has become required to change as an easy-to-do activity for any other professional.

Under these circumstances, VE has become required to maximize its effect for a shorter period of time. Specifically, shorter time is required for VE activity, preparation, member procurement, and proposal development.

VE effect and issue

Time effect

The standard VE activity has 10 steps to follow. Often times it requires about 48 hours, but sometimes it requires more time. The more effect one wants to gain on improvement, the more time he/she should spend on VE activity. If one spends insufficient time on one activity, he/she may not make a good change proposal.

That does not mean that one should not reduce time for VE activity. If you have made a good change proposal for a short time, it would be great. You would gain a high return on low investment. You might be praised for conducting VE effectively.

In reality, the time-cost relationship in VE activity is evaluated by return on investment (ROI). ROI is a value gained by dividing reduction cost from an improvement with cost on its activity. Whereas, cost on the improvement activity is gained by multiplying the number of its members with their activity time. In brief, we think that there is a correlation between the reduction cost from an improvement and the activity time.

Thus, we think that the better proposal one should make for an improvement, the more time he/she should spend on its activity. According to the improvement scale, we have determined an investment amount for VE activity and secured its effect.

Time issue

There is one problem – how should one keep time for VE activity? VE job plan was originated for creating a large-scale change proposal. In other words, it may work inefficiently on creating a small-scale change proposal. We may need a large or small improvement, depending on the activity. That is where a time

conflict occurs.

Some may claim that one should spend time for VE activity. VE brings a high return in relation to cost spent on its improvement activity. Therefore, we understand the idea that one should keep time for VE activity.

Despite its effect, VE activity time may burden members on duty. Even if we make a small change proposal, we would need at least 30 hours. Many VE experts point out that activity time burdens an organization and its members. As a result, VE may be rejected for application because of its time-consuming characteristic.

In response to its great time, VE for a short period of time is sought out especially, in a case where only a small change proposal needs to be made. In Japan, there are new techniques which have recently been developed in order to reduce time on VE activities. The paper will explain the following four techniques.

Short-Time VE techniques

2-Hour VE

“2-Hour VE” was developed by the Society of Japanese Value Engineering (SJVE). The SJVE started its development in 1997, and made it open to public in 2005. There are two purposes of this technique: One is for those with basic VE knowledge to improve value with ease and less time; the other to promote its wide use.

It was originally designed for the construction industry. Later, it was improved to expand its use in manufacturing and software development.

Only one A3 sized paper is necessary, with worksheets printed on its both sides. There are seven steps to follow. The FAST diagram used for this technique focuses exclusively on main areas to improve. To select key functions through brainstorming, it only needs one step, whereas the standard VE requires three steps.

Time required for each step is printed on the worksheets, totaling two hours. The worksheets are in a Q & A format and easy to follow for VE activity. One shortcoming of this technique lies in insufficient time on the FAST diagram – only 45 minutes. It is not suitable for an accurate analysis.

The worksheets in a Q & A format can be sent around to members by fax or e-mail. They are useful particularly when members are far away or cannot join a meeting.

This technique is useful for easy and simple themes to improve, such as a daily job, one part of a product, and a simple work system.

1-Drawing VE®

“1-Drawing VE®” was developed by Mitsubishi Electric Corporation. It is based on the aforementioned “2-Hour VE.” The difference between the two lies in that the latter needs only one side of a paper (Figure 1), whereas the former requires two sides. It uses an easier and simpler worksheet to follow.

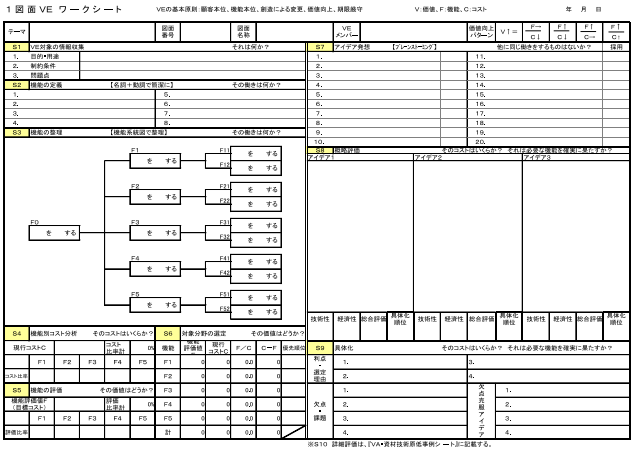

Figure 1: Sample of 1-Drawing VE® worksheet

There are two purposes of this technique: One is to re-realize the usefulness of VE and conduct VE for numerous simple daily themes to improve; the other to generate high motivation to challenge bigger themes through many small successes. This technique is suitable for those familiar with VE to conduct it for a short period of time; conversely, it is difficult for those unfamiliar with VE activity.

The worksheet is printed on one side of an A3 sized paper, with VE job plan. Its procedure is based on the standard job plan. One defines functions, based on a product drawing. Two hours exclude the time for alternative development.

To use this technique, all the members fill in a worksheet, projected on the screen by overhead projector. The required time is four hours: two hours for defining and evaluating functions; and another two hours for alternative development. It can be done in one day.

A team for this technique should include members with some VE experience. The technique is suitable for parts of a product, especially parts with a drawing, but not for the entire product. It is also suitable for easy and simple themes such as a daily job and a simple work system, as “2-Hour VE” is.

4-Meeting VE

“4-Meeting VE” was developed by one of the authors, Hisaya Yokota. There are two purposes of this technique: One is to stimulate creativity with VE and its mindset, rather than a large-scale improvement; the other to improve communications at work.

This technique is easy and simple to use. It requires four meetings to make a change proposal. Each meeting is short, two hours long. Each meeting requires one or two A3 sized paper(s). The entire four meetings require seven papers. There are three to four members. The technique is easy to use, with one’s colleagues at work.

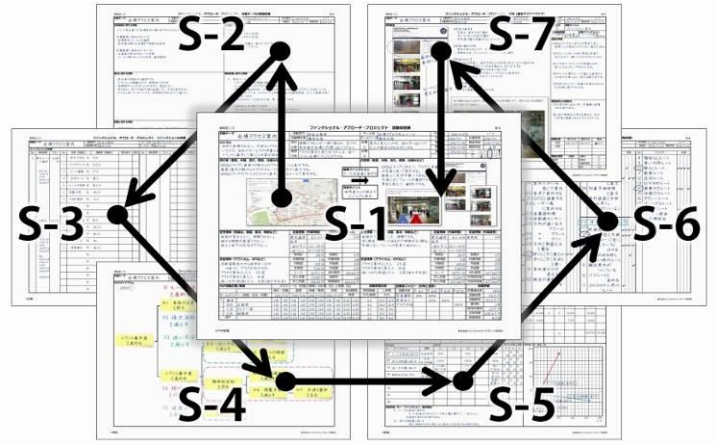

Figure 2: Procedure of 4-Meeting VE

According to its procedure, one starts the left side of the first sheet (S-1) and ends the right side of the first sheet (Figure 2). In the end, one can compare the first sheet before and after improvement. The worksheets indicate activity outlines and serve as detailed reports/records. In the worksheets, one can add if a change proposal has been made or not.

This technique is suitable for an improvement with creativity, but not for a large-scale improvement. It is also suitable for an improvement required for a short period of time. In other words, it is useful for specific and partial themes, but not for innovative or holistic themes.

5-Step VE

“5-Step VE” was developed by the other author, Kayo Uchida. There are two purposes of this techniques: One is for those with no VE experience to become familiar with VE easily and simply; the other to promote wide use of VE. The technique is customized for the medical and service field. Through the technique, members can improve their creativity and also act spontaneously.

The technique has five activities, up to alternative development. Each activity requires one hour and one A3 sized paper. The entire five activities require five sheets in total.

There are three features of this technique: 1) It is easy to use, even for those with no VE experience. The worksheets are all in an easy-to-follow Q & A format. All one does is fill in blanks in the order provided, as he/she proceeds to activities step by step; 2) Only five steps are to be followed. They are easier and simpler to use for VE beginners, unlike the standard VE with 10 steps which requires longer hours and more activities. Yet, 10 steps are not omitted, but integrated into five steps; 3) It uses visual images to represent evaluated value.

When setting a target value (input) or making a detailed evaluation (output), one can use a visual evaluation table (Figure 3). After drawing an arrow between the input point and the output point, one can easily understand the status of value.

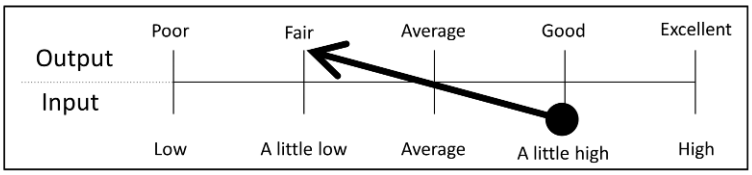

Figure 3: Visual evaluation

When evaluating functions, one can use an approach chart (Figure 4). The chart shows key functions plotted in a priority order. One can easily see if a given value is high or low.

The technique is suitable for themes such as a daily job or life and things to evaluate qualitatively; conversely, it is not fitted for themes to evaluate quantitatively.

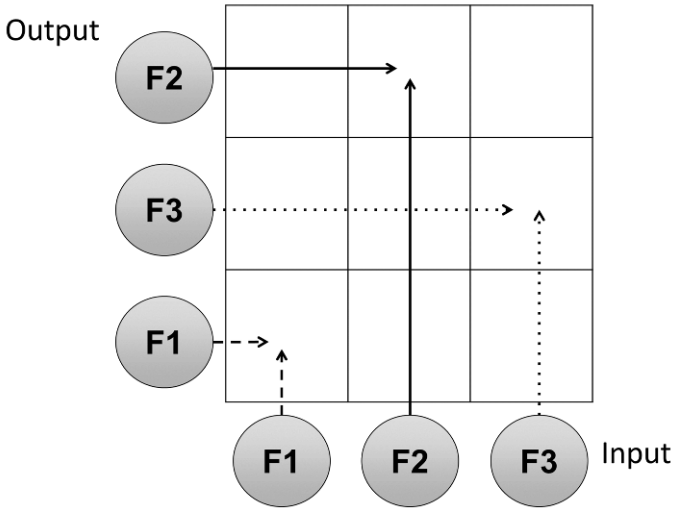

Figure 4: Plotting procedure of approach chart

Case study of 4-Meeting VE

Theme to improve and first & second meeting

The theme was “directions to the event venue.” The event was an open seminar. The participants had registered it in advance. They included first-time visitors to the venue. The event host had to give directions to the event venue.

The event organizer used to e-mail participants a Google map link. The route from the station to the event venue was registered on the map. The participants saw the Google map, after they received the e-mail from the event host. Most first-time visitors may have been careful, but some got lost and were late for the seminar.

With these in mind, the author used 4-Meeting VE to improve directions to the event venue. He first made an action plan and selected four members. Then, he set the meeting dates and hours, totaling 6.5 hours.

At the first meeting, the author shared with his members information regarding the theme to improve, such as the then method, its related issues, and requirements. Then, they defined functions. The hours spent for the first meeting were 1.5 hours.

At the second meeting, they made a FAST diagram with the theme: <Increase concentration on the event>. They selected five key functions: <Enhance direction communicability>, <Reduce body energy consumption>, <Reduce “lost” anxiety>, <Generate mental allowance>, <Avoid health damage> (Figure 5). The hours spent for the second meeting were 1.5 hours.

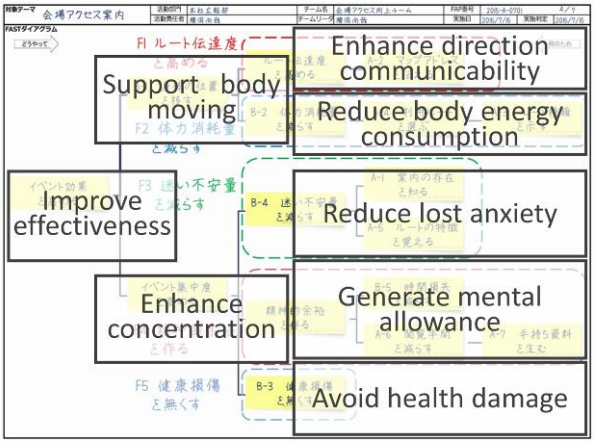

Figure 5: FAST diagram sample

Third & fourth meeting and improvement results

At the third meeting, together with his members, the author generated ideas concerning <Enhance direction communicability > through brainstorming. They generated 57 ideas and narrowed them down to 20 useful ideas. The hours spent for the third meeting were two hours.

At the fourth meeting, they developed an alternative. By repeatedly refining the 20 useful ideas, they made an excellent change proposal. It was the proposal that they should create a website for the directions with “street view” photos. The photos were taken from a visitor’s eye angle, and were added with direction “arrows.” The work took 1.5 hours. Finally, the author filled the change proposal in the appropriate blank on the right side of S-1 sheet so that they could compare the value before and after the improvement (Figure 6). Also, he calculated a cost saving, which turned out about JPY 1.4 million. The investment on this VE activity amounted approximately to JPY 100,000, and its ROI turned out 14:1.

The event host adopted the change proposal. Immediately afterwards, they started improvement activities. They created a direction website and subsequently all the event participants made it to the seminar without getting lost. They confirmed that 4-Meeting VE is suitable for small-scale improvements and that it is easy and simple to use.

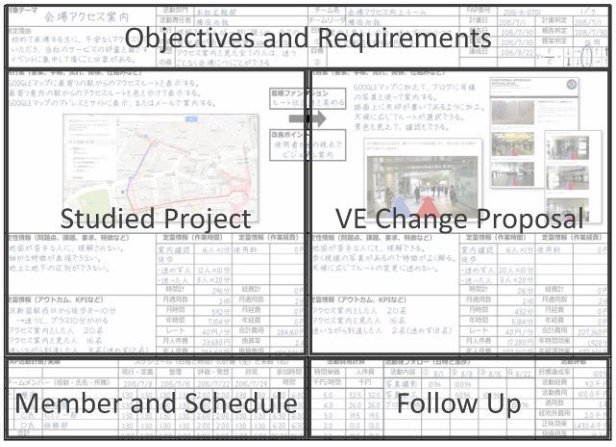

Figure 6: S-1 sheet

Case studies of 5-Step VE

Attracting more customers

The theme was to attract more patients at a dental clinic. The then methods were its flyers, website, and board. The clinic is conveniently situated in the Tokyo metropolitan area, but it was losing patients two year

before.

Through 5-Step VE, the author attempted attracting more patients. She had four staff members at the clinic. All of them had no VE experience. The author did five activities, each of which lasted for one hour.

In the first activity, they found points to consider through brainstorming. They were able to do so, as they simply answered questions printed in the worksheet. Also, they were able to know the status of value by visual evaluation. In the second activity, they defined functions. In the third activity, they made a FAST diagram and evaluated functions. In the fourth activity, they generated ideas through brainstorming. They came up with 48 ideas and narrowed them down to five useful ideas. In the fifth activity, they made a change proposal (Figure 8). It was the proposal that they should promote a new campaign on their website to attract more patients. The proposal was adopted and carried out.

Before VE activity, the members were not accustomed to creative activities. Afterwards, they seemed satisfied with sharing their job-related issues and stimulating their creativity.

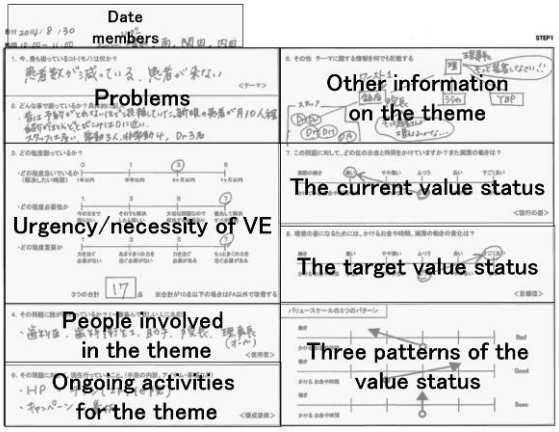

Figure 7: Worksheet sample

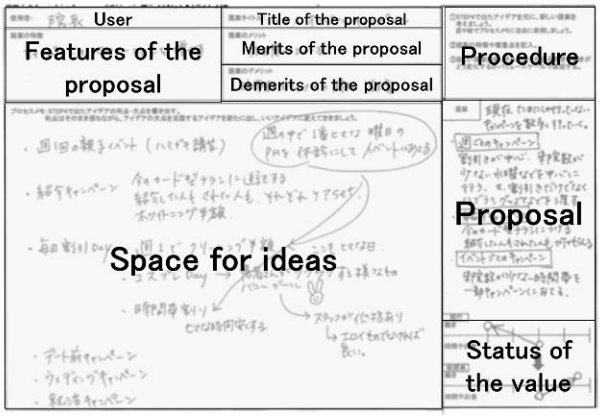

Figure 8: Worksheet sample

Maximizing an office space

The theme was to maximize an office space at another dental clinic. The then office left things untidy, and therefore the staff had difficulty in finding what they needed.

The author employed 5-Step VE to maximize the office space. She had four staff members at the clinic. All of them had no VE experience. The author did five activities, each of which lasted for one hour.

In the first activity, they collected information and found points to consider by answering questions in the worksheet. In the second activity, they defined functions, based on work at the office. In the third activity, they made a FAST diagram and evaluated functions (Figure 9). By using the approach chart, they were able to understand the priority of value, and areas for improvement. In the fourth activity, they generated ideas through brainstorming. They came up with 55 ideas and narrowed them down to three useful ideas. In the fifth activity, they made a change proposal (Figure 10). It was the proposal that they should get things organized by function, but not by kind. With this proposal, they maximized the office space.

Moreover, another effect was that the staff started communicating better and building a team spirit. That led to more work efficiency. Also, the members enhanced their creativity and engaged in improvement activities spontaneously.

Through its activities, the staff and the owner alike felt 5-Step VE effective for improvement.

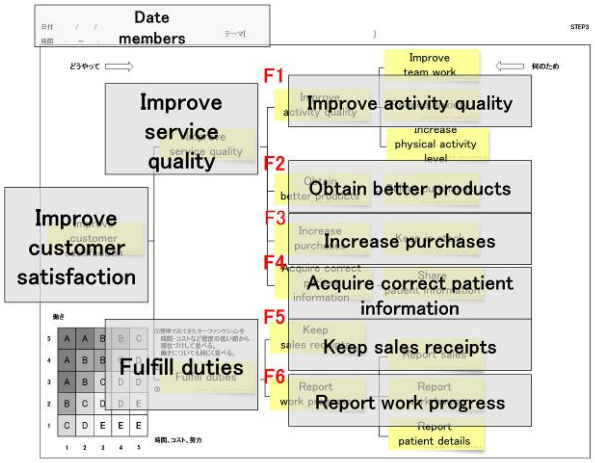

Figure 9: FAST diagram sample

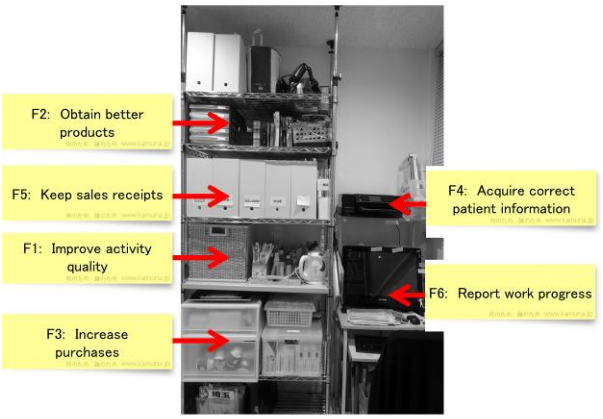

Figure 10: Change proposal sample

Conclusion

With regard to Short-Time VE practiced in Japan, the authors have presented four techniques and three case studies. In Japan, there are several other Short-Time VE techniques available, which have been developed by various companies.

Many years have passed since VE was invented. During all these years, the times, people, business, and technologies have changed. Accordingly, we have improved VE. It is Short-Time VE that accommodates various needs in the time-sensitive, present era.

The authors wish to pass out this excellent Short-Time VE to the next generation. Also, they will continue developing better techniques, according to ever-changing time and members. They hope that this paper will be exposed to many VE experts' eyes and that VE will expand its scope of application to many more fields and will be utilized for many more years to come.

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