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THE VALUE MANAGER

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AIMS AND OBJECTIVES OF THE HKIVM

- To create an awareness in the community of the benefits to be derived from the application of Value Management in Hong Kong.
- To encourage the use of the Value Management process by sponsors.
- To establish and maintain standards of Value Management practice in Hong Kong.
- To contribute to the dissemination of the knowledge and skills of Value Management.
- To establish an identity for the Institute within Hong Kong and overseas.
- To encourage research and development of Value Management with particular emphasis on developing new applications of the process.
- To encourage and assist in the education of individuals and organisations in Value Management.
- To establish and maintain a Code of Conduct for Value Management practitioners in Hong Kong.
- To attract membership of the Institute to support these objectives.

TABLE OF CONTENTS

Editorial 1
Message from the President 2
Using Value Management Technique with Risk Analysis to Build Value 3
Value Management Study on the Uprating of The Tuen Mun Salt Water Supply System 7
VM In China: Opportunities and Challenges 12
Photos Taken at the 6th International Conference 18
HKIVM News 19
Forthcoming Events 19

EDITORIAL

Welcome to the last issue of The Value Manager in year 2003. Apart from the President's message, you will read three technical papers on a variety of value-related topics. Jain's paper is about using VM techniques with risk analysis to build value. He argues that if VM techniques are applied in the risk analysis/management process, results can be very powerful, because VM enables applying stimulating ideas thereby improving functionality, and this could have a multiplier effect resulting in building value and reducing costs. Chang et al introduced a VM case study on uprating the Tuen Mun Salt Water Supply System. The study proved that VM is a useful tool to enable all stakeholders involved on the project to have a better understanding of the constraints and requirements of the project. It also helped create a team approach to problem-solving process. As a consequence it was possible to quickly focus on those options which best met the overall project objectives and through the adoption of mutually agreed value criteria and weightings identify the optimal solution for the project. Shen and Liu's paper looks into the current state of VM applications in China. By using the construction and manufacturing industries as examples, the paper investigates the difficulties frequently encountered by end users, highlights the major differences in the approaches practised in China and abroad, reveals the challenges ahead, and explores opportunities for practitioners to work together to improve VM applications in China. I hope you enjoy reading these articles before or even during the forthcoming Christmas holiday. May I also take this opportunity to wish you a wonderful Christmas and a very happy, productive, and healthy New Year!

Geoffrey Shen

Editor, The Value Manager

MESSAGE FROM THE PRESIDENT

Tony Wilson
President of HKIVM

Hello everyone, it's that frantic time Christmas and we are recovering after our International Value Management Conference which has been the resounding success it has been in the past.

Photos of the event are on our web page and we really appreciated everyones support and effort. Next time we need more participants especially from the private sector and we know that our Conference is excellent Value for money for anyone wishing to enhance their own understanding of Value Management as well as their own personal performance. Our two evening social events went very well and were enjoyed by all.

One of the excellent virtues of Value Management is establishing "quality" and "fitness for purpose". These are often overlooked in the selection of materials and details of projects. Cost, quality, appearance, ease of use, installation time, replacement ease, maintenance and cleansing, environmental worth, etc are all considerations that have to be made. Sometimes we don't have enough time therefore it is best to seek specialist or quality advice at the right time. This should be early in the process when it can be established which are the main items to concentrate on. With the correct emphasis on the main items and elements, using the correct balancing of information, informed decisions can be made. VM techniques can be very helpful in this process through the use of a comparison matrix, but great care needs to be taken in establishing weightings, therefore please use an experienced VM practitioner.

We held our first lunch presentation on the 26th September when Anne Copeland Chui gave a very interesting insight into facilitation and consensus building. Again, of key importance is starting the process earlier, usually much earlier than most people think, to build teamwork and a sense of contribution of the participants. For the best outcome for our harbour and infrastructure, its seems consensus is needed. Our second lunch presentation was 3rd November by Prof. Peter Brandon, University of Salford UK, who played a significant role in UK Construction Research Policy and his topic concerning Research agenda and directions for the construction industry was stimulating to say the least.

With Christmas arriving and signs of recovery in some business sectors, I wish you all well in your current endeavours and for any holidays you may have over the festive season.

Best wishes to all,

Tony Wilson

(A.R. Wilson)
President HKIVM

USING VALUE MANAGEMENT TECHNIQUE WITH RISK ANALYSIS TO BUILD VALUE

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ABSTRACT
Using Value Management technique with Risk Analysis can enable avoiding negative consequences of risk assessment and seizing on positive impacts through value management. Risk Management is a process of well defined steps which supports better decision making by providing greater insight into risks and their likelihood/impact. In accordance with AS/NZS 4360 Standard of Risk Management, steps involved are: to establish the context identify risks; to carry out risk analysis in terms of likelihood, consequences of overall risk levels; to do a risk evaluation, or in other words, prioritise them in order of risk level; to treat risks; and to monitor and review the risk strategies to confirm that treatment is effective and is working. However, in practice once risks are identified, people usually apply ad hoc means to treat risks. If Value Management techniques are applied in the risk analysis/management process, results can be very powerful. Value Management enables applying stimulating ideas thereby improving functionality. This could have a multiplier effect resulting in building value and reducing costs.

INTRODUCTION

Value Management can be successfully applied in risk analysis/management with powerful outcomes. It enables applying stimulating ideas thereby improving functionality. This in turn could have a multiplier effect resulting in building value and reducing costs.

RISK ANALYSIS / MANAGEMENT

In accordance with AS/NZS 4360 Standard of Risk Management, steps involved in risk management are:

a. Establish the Context
In this step, the strategic, organisational and risk management context in which the overall risk management process will take place is established.

b. Risk Identification
The main aims in risk identification are to establish what can happen and how and why it might happen.

c. Risk Analysis
The third stage in the process of risk management is risk analysis. The steps involved is risk analysis are

- Determination of existing controls
- Determination of likelihood
- Determination of consequences
- Combination of consequences and likelihood, within the context of existing controls, to yield a measure of risk (risk level)

d. Risk Evaluation
The fourth phase of risk management is prioritisation of risks. After risks have been identified and analysed a large list of risks and a measure of the severity of each of those risks has been established. In risk evaluation, the risks are prioritised; i.e. they are ranked in order of severity, using pre-agreed criteria.

e. Risk Treatment
The risk treatment process consists of:

- Identification of risk treatment options
- Evaluation of risk treatment options
- Preparation of risk treatment plans
- Implementation of risk treatment plans

Risk treatment options include:

- Risk avoidance
- Risk acceptance and establishment of a risk financing plan
- Reduction in the likelihood
- Reduction in the consequences
- Risk transfer
- Retention of residual risk

f. Action Planned, Monitoring and Review

VALUE MANAGEMENT

Methodology for Value Management following the Australian Standard AS4183 involves six steps, as follows:

1. Information phase: Overview of the context and goals
2. Functional analysis: Identification of key functions – the purposes of each component, why it exists, the cost of providing the function, the worth, what it must do, what can it do.
3. Creative ideas and generation: Generation of creative alternatives through brainstorming and other creativity techniques – can we simplify, combine or eliminate etc.
4. Evaluation and development: Comparison of ideas and short-listing the most promising for further investigation.
5. Action plan: Team to agree on an action plan.
6. Recommendations for implementation: Team provides recommendation for implementation

USING VALUE MANAGEMENT IN RISK MANAGEMENT

The diagram below shows how the two can be linked together.

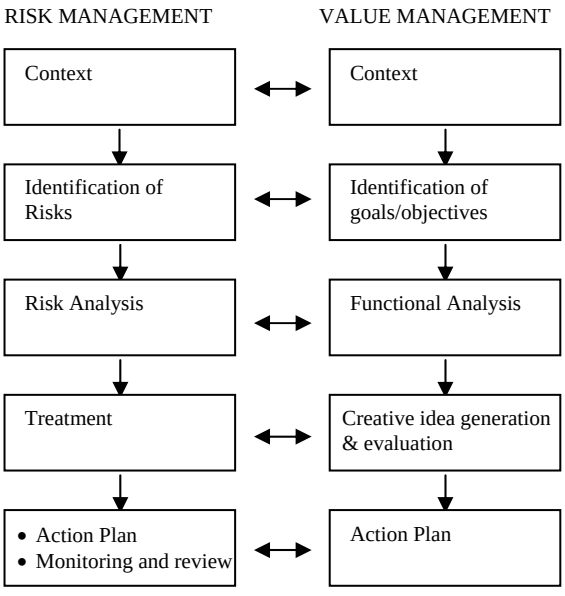

Figure 1

As can be seen from above, project context objectives and goals need to be common feature. Whereas in risk management, risks have to be identified in the context of project goals and objectives, these are important in value management for the purposes of functional analysis. The greatest benefit of Value Management in risk management could come from applying it at the risk treatment stage. At this stage there could be a number of options for treating the risk but there would be only one option which is the "best", and for selecting this option, Value Management could be effectively applied. This is illustrated by a case study below.

CASE STUDY

A steel framework supports a multi storey brick and concrete commuter car park over several freight train lines. There is a rail junction, crossover as well as several catch points under it. The car park structure is presently at risk of collapse over the train if a derailment occurs in or around the junction or crossover resulting in collision with the supporting column(s) of the car park structure. The objective of the risk management plan was to identify and analyse the risks posed and recommend appropriate risk mitigation strategies.

A number of risk scenarios were identified as listed below:

- Driver jumps signal – runs through Up and Down catch points
- Roll back on Up Goods Botany line – Down Goods catch point
- High speed train on Illawarra line
- Derailment due to wagon fault/screwed journal. (increases due to the project)
- Car falling from car park
- A vehicle falls from the bridge
- Train collision on the new crossover
- Track failure
- Signalling failure
- Vandalism or sabotage causing derailment – 1m high fence
- Vandalism or sabotage causing derailment due to easy access from the training school

- Container (out of gauge) hitting the columns
- Incorrect manual working directions from signaller to driver

Consequences of most of the above risk scenarios was the train hitting the columns supporting the car park structure with the result of the structure collapsing over the train.

Each of these risk scenarios were then subjected to a risk analysis that involved:

- Looking at the likelihood using an agreed probability rating scale
- Looking at the consequence scenarios for each risk scenario (in other words what would happen if risk scenarios was to eventuate)
- Working out a consequence rating for each consequence scenario using an agreed rating scale
- Working out an overall risk level for each consequence scenario.

Table 1 shows the likelihood of risk scenario 1: Driver jumps signal – runs through Up and Down catch points. This table also shows the various consequence scenarios associated with this risk, consequence ratings and overall risk level.

Table 1

No	Risk Scenarios / Factor	Likelihood		Consequence Scenario	Consequence		Risk Level	
		Rank	Rated		Rank	Rated	Rank	Rated
1.	Driver jumps signal – runs through Up and Down catch points	M-L	0.3	Down Goods – SPADS and doesn't derail	N	10	N	3
				Down good – SPADS and derails, structure collapses	E	160	E	48
				Up Goods – shunts across, doesn't derail (new)	N	10	N	3
				Up Goods – shunts across and does derail, hits structure or other train	E	160	E	48
				Up Goods – shunts across 788C and derails (new)	L	20	N	6

N: Negligible, L: Low, E: Extreme

In the case of this risk scenario, there were two consequence scenarios with "extreme" risk levels, namely Down Goods train derails and hits the columns collapsing the car park structure and Up Goods train shunts across, derails and hits the column collapsing the car park structure. Table 2 shows the risk mitigation strategies that were thought to be pertinent for both these consequence scenarios.

Table 2

Consequence Scenario	Risk Mitigation Strategies	Further Action Required
Down Goods – SPAD and derails structure collapses	• Driver training	• Bring to the attention of operators new signals
	• Lower train speeds	• Put in Speed boards
	• Selective protection of columns - deflection wall - beams that would allow some columns to be taken out	• Investigate options in this regard
	• Install guard rails	• Investigate
	• Demolish car park	• Investigate
	• Full column protection	• Investigate

As is obvious that there were four risk mitigation options recommended for further investigation. Similarly for other risk scenarios and resulting consequence there were risk mitigation options recommended. In general, it was found that selecting one of the following four risk mitigation options, mitigated most of the risks consequences with high or above risk levels:

- Selective protection of columns
- deflection wall
- beams that would allow some columns to be taken out
- Install guard rails
- Demolish car park
- Full column protection

With the overall goal being to avoid train accident and objective(s) being to mitigate the associated risks, these options were evaluated using value management technique (other criteria such as cost of pursuing a particular option was also taken into account). Interestingly "Demolish the car park" was found to be the most preferred option.

CONCLUSION

This case study established how value management technique can be used successfully in risk management to build value. In this case, the result was:

Reduced	• safety risks • Capital cost • Design and construction time
Increased	• Safety of train operations • Functional efficiencies (speed restrictions of trains done away with)
Ensured	• Input by all stakeholders • Acceptance by train operators • Optimisation of resources to be used

Clearly, using value management with risk management enabled applying stimulating ideas, improved functionality and had a multiple effect, resulting in building value and reducing cost.

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VALUE MANAGEMENT STUDY ON THE UPRATING OF THE TUEN MUN SALT WATER SUPPLY SYSTEM

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ABSTRACT
Due to the projected increase in population, the existing Tuen Mun salt water supply system will need to be uprated. Atkins China Ltd. was commissioned in October 2000 by the Water Supplies Department (WSD) to undertake a Preliminary Project Feasibility Study (PPFS) to investigate the best solution of meeting the projected flushing water demand. At the outset of the PPFS it was recognised that there were a wide range of potential solutions available, such as different water sources at different locations with different methods of delivery. All had to meet WSD's stringent requirements for quality and reliability. In addition, it was recognised that the Project implementation would involve many other Government departments and would require their endorsement of the selected scheme. The need for a structured decision making approach was recognised as being necessary to objectively compare these technically differing solutions and to obtain the agreement of a number of external organisations, each with potentially different objectives. A Value Management (VM) Study was, therefore, undertaken. This VM Study proved to be a very useful tool to let all stakeholders involved on the project understand the constraints and requirements of the project. It also helped create a team approach to problem-solving process. As a consequence it was possible to quickly focus on those options which best met the overall project objectives and through the adoption of mutually agreed value criteria and weightings identify the optimal solution for the project. Obtaining ultimate approval for this preferred option was also simplified and speeded up. This Study clearly demonstrated the benefits of adopting VM as a method of identifying the optimal solution for a complex Hong Kong waterworks project where there were a number of widely differing technical solutions, and the preferred option would need endorsement from a number of Government departments.

INTRODUCTION

The flushing water system in Tuen Mun currently consists of two supply zones:

- Tuen Mun North and West : Salt water is provided in form of a typical supply system – a seafront pumping station with a salt water service reservoir acting as a balancing tank to the system.
- Tuen Mun East : Fresh water is used to temporarily supply the flushing water system from two fresh water service reservoirs. The arrangement is described as temporary mains supply for flushing.

By 2009, the population in Tuen Mun is projected to have increased from the current level of 520,000 to 680,000. The new flushing water system will be required to provide an additional 11,000m3/day to uprate the system in Tuen Mun North & West and 10,000m3/day to replace the temporary supply in Tuen Mun East.

ADOPTION OF A VALUE MANAGEMENT APPROACH

It was realised that identification of the optimal solution for enhancing the flushing water system would involve inputs from and the agreement of, a number of internal sections of WSD. The geographical extent and nature of the works required also meant that they would affect a range of other Government Departments. Typical factors which the PPFS had to address were :

- Financial implication
- Technical issues
- Land
- Traffic
- Environmental impacts
- Functional requirements
- Social consideration
- Programming
- Project interfaces

A Value Management approach was, therefore, adopted as being the best method of identifying the most preferred scheme that reconciled the interests and requirements of each of the stakeholders.

VALUE MANAGEMENT PROCESS

The VM process was conducted in form of a VM study with two workshops. The workshop was attended by the relevant representatives from WSD, Environmental Protection Department, Planning Department, Highways Department and Atkins China. Unfortunately, not all of the Government departments invited were able to attend the workshop thus potentially undermining the process. This is discussed later.

The initial workshop provided all parties with a good understanding of the key issues and constraints affecting the project. Those identified included:

- Key issues associated with treatment, maintenance, pumping stations, pipeline alignment and other engineering issues associated with using salt water or raw water as a supply source.
- Costs, public reaction and upgrading requirements for existing facilities.
- The main issues in increasing the capacity of the existing system are the physical and mechanical limits of expansion, disruption to the existing system, risks associated with a centralised operation and flexibility for future expansion.
- The construction of a new pumping station affects land, impacts on surrounding features, requires operation and maintenance access, suitable pipeline alignments and has programme implications.
- Traffic constraints – existing road opening restrictions in Tuen Mun and constraints on traffic diversions necessary for pipeline construction.
- Environmental – construction impact to the environment (noise, air, ground water etc.,) and potential operational impacts.
- Water quality – compliance with WSD's Water Quality Objectives (WQO), stable salinity requirements associated with the treatment by electrochlorination, minimum water depth at the intake to prevent sedimentation abstraction.
- Mainlaying – constraints from existing utilities and facilities.

A statement of objective was agreed as follows:

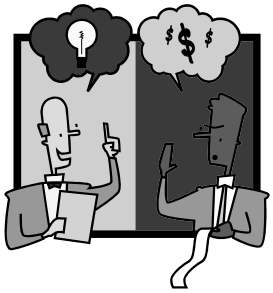
"To provide a sufficient quantity of flushing water to the Tuen Mun District, in the most cost-effective manner, within a reasonable time frame, and with due consideration to the impacts of construction and operation of any new facilities, minimising disruption to existing supply"

VALUE CRITERIA

Value criteria were then established and ranked in order of importance with agreed weightings as set out in Table 1 for use in the subsequent evaluation stage.

Table 1: Value Criteria, Ranking and Weighting

Rank	Value Criteria	Weighting
1	Cost, Whole Life Cost	42
2	Programme	38
3	Reliability of Supply	33
4	Public Reaction	28
5	Design Life	24
6	Maintainability	17
7	Minimal Land	14
8	Safety	9
8	Environmental Impact	6
10	Impact on Existing System	4
11	Traffic Impacts	2
12	Flexibility for Future Expansion	-



CREATIVE PHASE

Nineteen different options of improving the flushing water system were identified in the creative phase.

Potential sources of water included:

- Sea water
- Raw water
- Treated sewage effluent
- Grey water
- Fresh water and
- A combination of the above

Several potential locations were identified for each of these water sources including: numerous locations along the Tuen Mun coastline for sea water; Tai Lam Chung Reservoir and several existing irrigation reservoirs for raw water; three different sewage treatment works for treated sewage effluent. Conveyance systems included pumped, gravity or a combination of pumped and gravity.

An initial option evaluation identified that three out of the nineteen options could be dropped. The remaining sixteen were further developed prior to evaluation at a second workshop.

EVALUATION OF OPTIONS

The development of each of the sixteen options was presented at the next workshop and the weightings assigned to each of the value criteria reviewed to ensure that they accurately reflected their importance in the overall evaluation of each option (see Table 1). The ability to reach a quick agreement among the participants was considered to be the result of their full understanding of the project and its key issues and constraints.

- The VM Study had now reached the comparative analysis stage. A numeric scoring matrix was set up to facilitate a scientific evaluation. For convenience and to save time the numeric scoring matrix was developed with the use of a spreadsheet. The matrix listed all the alternative schemes and their associated agreed value criteria weightings.

This evaluation identified three options as clearly being ahead of the other options:

- Option 1: SW1 [score - 217] - Construct a new pumping station at Lok On Pai and a new service reservoir at Siu Lam to meet the projected flushing water shortfall.
- Option 10: RW5 [score - 203] – Construct a new pumping station at Tai Lam Chung Nullah and a new service reservoir at Siu Lam to meet the projected flushing water shortfall.
- Option 14: FW1 [score - 201] – Utilise fresh water supplied from Tuen Mun Water Treatment Works to meet the projected flushing water shortfall.

Option 1 was identified as the most preferred scheme to uprate the Tuen Mun salt water supply system. This option scored relatively high in all of the value criteria. It provides a relatively simple solution using a reliable water source that would receive no adverse reaction from the public.

Its simplicity meant that this option would be cheaper than many of the other options. Option 1 also scored well on programme, design life and safety. The proposed supply pipeline alignment to the service reservoir is comparatively short and aligned such that impact to traffic is not serious. The scheme layout does not use excessive amount of land, has no adverse impact on the existing system and can be flexible for future changes and hence scored well for these value criteria. Maintainability of this scheme compared to other schemes was considered to be very good due to its simplicity.

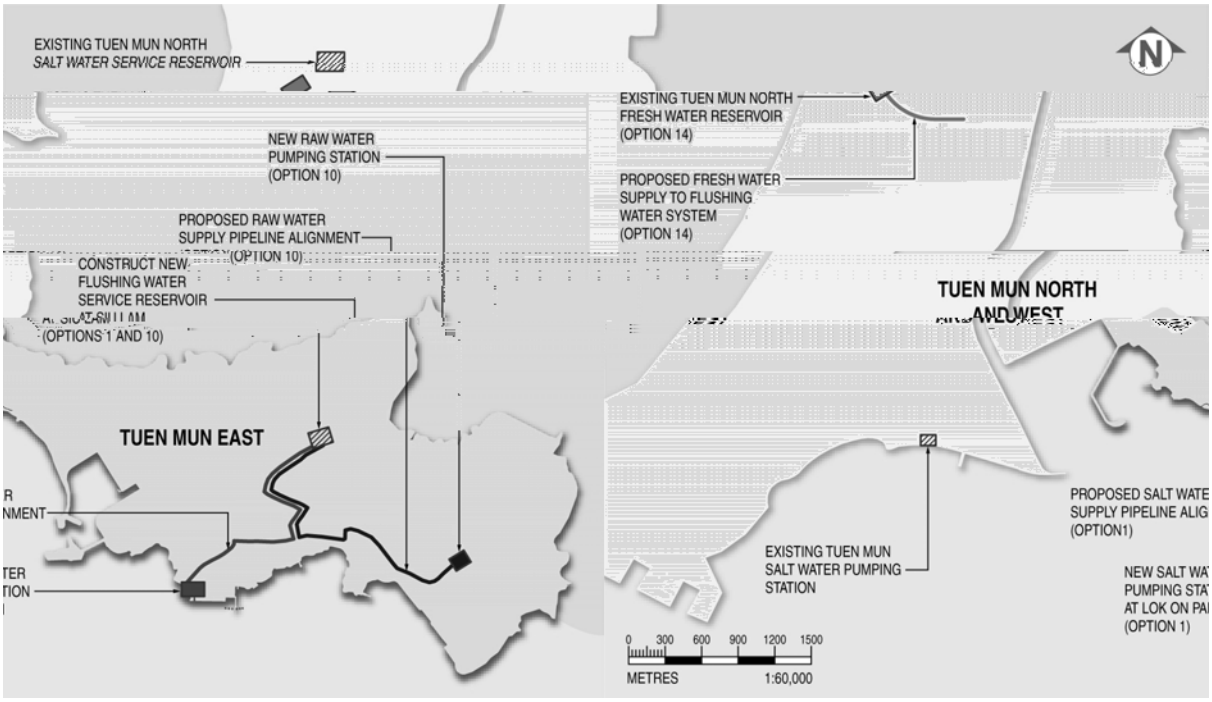


Figure 1 - Preferred Options as Identified in VM Study

Option 10 was ranked second and scored relatively well in all of the value criteria. The method of uprating the Tuen Mun salt water supply system proposed in this scheme is similar to that as proposed in Option 1. The main difference is the source of water. Use of raw water over sea water meant that the value criteria of cost, reliability of supply, public reaction and flexibility for future changes faired slightly lower for this scheme than for Option 1. Option 10 also scored slightly lower for its impact on traffic due to the proposed supply pipeline alignment along Castle Peak Road

Option 14 was the third ranked option. This option had mixed scores for important value criteria, scoring poorly for cost and public reaction, but scoring well for programme and the reliability and quality of supply. This scheme had its merits because of no additional land required, no impact on traffic, with a longer design life and being safe.

Cost was an important factor in the evaluation as reflected by its assigned value criteria weighting. Whole life costs were used because of the recurrent cost of pumping and water costs. As shown in Table 2, Option1 has the highest initial capital cost of the three options but has significantly lower recurrent costs. Option 10 utilises raw water purchased at HK$3/m3 from across the mainland in Guangdong Province while Option 14 utilises even more expensive treated water at HK$9/m3. The consequences of this are that although the initial cost is greater, Option 1 will yield savings of approximately HK$450M and HK$1,300M respectively over Options 10 and 14 over a 30 year period.

Table 2: Cost Comparison

Option	Capital Cost (HK$M)	Recurrent Consequences Cost / year (HK$M)
1	120	4
10	105	20
14	0	52

NON-ATTENDING STAKEHOLDERS

As noted earlier in the Paper, not all Government Departments were able to attend the workshops. This created difficulty later when the VM study findings were circulated as two of the Government Departments disagreed with the value criteria ranking and weightings, and requested the inclusion of additional value criteria.

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waste i.e. it improves efficiency.

In thi case, as cost was seen as an
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most ve option to be adopted while
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In the ancial climate there is
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CON

The V ocess allows a structured
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Gover ects that involve the interests
of a w stakeholders.

This a rrect, overall solution for
Gover identified and to do this early
in the feasibility study stage, thus
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risk of the project programme. It
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ACKN EMENTS

The auth thank Mr. Willian
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VM IN CHINA: OPPORTUNITIES AND CHALLENGES

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ABSTRACT
Value management (VM) has been practised in China for more than two decades. China's recent entry into the World Trade Organization (WTO) has brought a new wave of interest among many enterprises in the use of value methodology to improve their competitiveness in the market place. This paper looks into the current state of VM applications in China. By using the construction and manufacturing industries as examples, the paper investigates the difficulties frequently encountered by end users, highlights the major differences in the approaches practised in China and abroad, reveals the challenges ahead for China's VM development, and explores opportunities for practitioners in China and in the developed countries to work together to improve VM applications. This paper concludes that several critical actions must be undertaken in China to face the challenges, and a good opportunity is emerging for practitioners in China and abroad to work together to further promote the proper use of VM throughout China.

Keywords: VM; China; Construction industry; Manufacturing industry

INTRODUCTION

Last year, China successfully joined the World Trade Organization (WTO) after many years of effort. Whereas some have highlighted the benefits of membership, it is important to note that it will also bring furious competition to many sectors of the national economy. This situation places an urgent demand on national industries to increase their competitiveness through the use of advanced management methods. A new wave of interest in using the value methodologies has been observed recently in many companies.

VM is not a new concept in China: it is widely referred to as value engineering (VE) and was introduced into China's manufacturing industry in 1978 through cooperation with Japanese manufacturers (Han, 1998). Encouraged by success in the manufacturing industry and advocated by the government, VM was gradually adopted by other industries and enjoyed significant growth in the first 15 years since its entry into China. Many VM activities were carried out in the country and a large volume of VM related books were published. In 1988, the 10th year of VM application in China, President Jiang Zemin wrote to the Shanghai Value Engineering Society and highly praised for the success of VM applications in China.

VM applications declined sharply after China started its transition from a planned economy to a market economy in the mid 1990s. This radical transition pushed many state-owned companies, the main users of VM in China, into a difficult situation. The traditional VM practice in these companies, which was based on the planned economy, has broken down, but no replacement for using VM in the new economic environment has been established. It is widely believed by local experts that the new economic system will motivate the application of VM in the long term (Hu, 1999; Ma, 2000). However, there are many issues to be addressed to promote its use in the new environment. This paper looks into the current state of VM practice in China and reveals the challenges to its future development. The opportunities for local and foreign practitioners to cooperate are also discussed.

THE RESEARCH METHOD

In order to explore the current state of VM usage in China, 2000 copies of a questionnaire were mailed to chief engineers in 1000 manufacturing companies and 1000 construction companies (including design institutes and contractors etc.). The sample companies were randomly selected from contact lists provided by the Information Centre of the Ministry of Construction in China and the Association of China Manufacturing Enterprises. Companies in the sample hold Class A qualification, which is issued to top class companies by the Government according to a number of criteria, such as the number of

employees, net assets, annual value added, and turnover etc. Of the companies selected, 155 construction companies and 162 manufacturing companies have returned the questionnaires, representing a response rate of 15.5% and 16.2% in the two sectors respectively.

After preliminary analysis of the survey results, follow-up interviews were conducted in Beijing, Tianjing, and Guangzhou, the leading cities for VM applications in China. Besides practitioners in six companies, seven VM experts were interviewed in these cities. Apart from obtaining comments and elaborations on the preliminary results from the questionnaire survey, a number of additional questions were asked to gather in-depth information concerning VM in China.

CURRENT STATE OF APPLICATIONS

Awareness of VM

According to the survey, 79% of the respondents from construction and 98% from manufacturing had heard of the term VM or other synonymous terms such as VE, value analysis and function analysis. The high awareness level in the manufacturing industry reflects that it is the most active field for VM usage in China, and VM knowledge has been widely disseminated in this sector in the past 20 years. However, it should be pointed out that the real situation might be somewhat lower than these figures, since some respondents who had not heard of these terms might not have bothered to return their questionnaires.

Application of VM

The survey results show that only 24% of the respondents in construction had experience in applying VM, while the percentage was 51% in manufacture. Among the respondents in construction, a small proportion indicated that they had never participated in a structured VM study, but that the philosophy and techniques of VM had been used to tackle problems encountered at work.

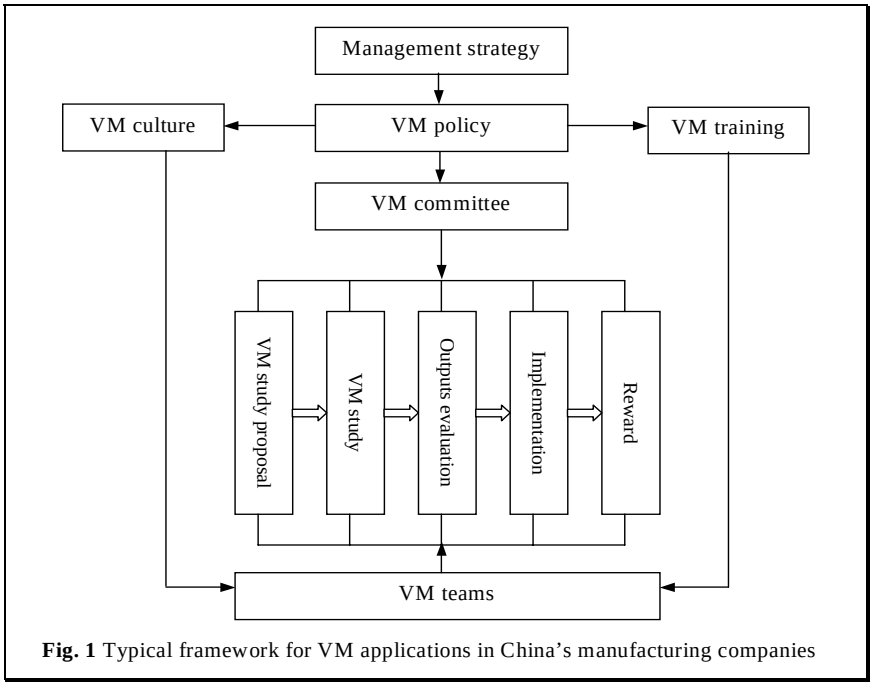

Fig. 1 Typical framework for VM applications in China's manufacturing companies

VM activities in most manufacturing companies are based on the internal VM policy of the companies. Fig. 1 illustrates a typical framework for VM implementation in the manufacturing companies in China. A VM committee, often consisting of senior managers, engineers, financial staff and VM coordinators, is formed to manage, support and supervise VM activities. Normally, a VM study goes through the following three stages:

1. VM study proposal - Any department or temporary team within the company can submit VM study proposals to the VM committee. In a proposal, the proposers explain the objectives,

reasons, costs, schedule, estimated outputs, and the preparation for the proposed VM study. The VM committee will evaluate the proposal against a number of criteria. If the proposal is approved, the proposed VM study will be conducted by a team of the proposers, under the management of the VM committee.

2. VM study - The VM team carries out the VM study in accordance with the VM philosophy, job plan, and techniques. However, instead of a concentrated, continuous workshop such as a 40-hour workshop, the VM team members meet irregularly to explore, develop and test alternative solutions without suspending their normal work duties. Therefore, it is common for a VM study to last several months.

3. Evaluation and implementation - The developed alternative solutions with test reports will be submitted to the VM committee. Their effects in cost reduction and value enhancement will be thoroughly evaluated before they are fully implemented. If significant improvement is made from the VM study, the VM team will be rewarded according to the savings produced. The survey also reveals that VM applications in the construction industry are seldom initiated by clients. The use of VM at the design stage depends heavily on the initiative of the design team or encouragement from the management of design institutes. The tight budget of the project is normally an important force driving designers to apply VM. Some contractors have also established VM policies to promote the use of VM in the construction stage. However, the purposes of these attempts are to find the optimum construction method and make savings for the contractors themselves, which has little to do with clients. Overseas experiences indicate that the mandatory VM requirements initiated by clients have made an important contribution to promoting VM applications, especially in the initial development stage of VM (Dell'Isola, 1982). Educating clients seems to be a critical task for promoting VM applications in China's construction industry.

Differences in the practice

Follow-up interviews and discussions with local VM practitioners and experts also reveal that VM is currently practised differently in China, away from the overseas mainstream (Miles, 1989; Male et al., 1998; Green, 1994; Norton and McElligott, 1995). The major differences are summarised in Table 1.

Table 1 - Comparison of VM practice between China and overseas

Items	Chinese practice	Overseas practice
Subjects of VM studies	Existing products/projects, often related to tactical problems.	Proposed and/or existing products/projects, related to both tactical and strategic problems.
Facilitator of VM studies	In-house VM directors or engineers.	Internal or external VM experts.
Timing of VM studies	In design, production or construction stages.	From the concept to completion of a project/product.
VM team composition	In-house staff, several people familiar with the subject are involved.	Relevant stakeholders, often a large number of persons are involved.
VM workshop style	Informal workshop adopted.	Concentrated, continuous workshops preferred.
Function analysis	Using mathematical methods extensively to measure functions and to identify poor value.	The purpose here is to clarify clients' requirements and to understand their value system and identify poor value.
Duration	Depending on the subject under study, possibly several months.	Normally last for only a few days.

Difficulties in applying VM

Table 2 shows the difficulties of applying VM, ranked by the respondents from two industries. The top three difficulties are: lack of VM knowledge, lack of national VM standards, and lack of qualified VM facilitators, although they are ranked differently in the two sectors.

Table 2 - Difficulties in applying VM in the construction and manufacturing industries

Difficulties	Rank (Construction)	Rank (Manufacturing)	Overall
Lack of national VM standards	2	1	1
Insufficient time to carry out VM	4	4	4
Lack of VM knowledge	1	3	2
Lack of qualified VM facilitators	3	2	3
Defensive attitude of other professional teams	7	5	5
Too expensive to carry out VM	5	7	5
VM prolongs product/project completion time	6	6	5
Interruption to normal work schedule	8	8	8

CHALLENGES AND OPPORTUNITIES

The questionnaire survey and the follow-up interviews reveal that the most significant challenges in VM development in China are the limited scope of applications, the techniques used in the studies and the measures adopted to promote applications. It has been observed that VM applications in China are mainly confined to the manufacturing industry and seldom occur in other industries. According to Xiao (1998), over 80% of VM activities in China are implemented in the field of manufacture. Because of the overwhelming influence of the manufacturing industry, large volumes of VM literature have been written for use in the manufacturing industry. VM societies in China are represented mainly by members from the manufacturing sector. Little effort has been made to extend VM applications to other fields. Whereas VM has been used in the construction industry overseas for many years and this has become one of the most active fields for VM application, the usage in China's construction industry is still in its early stages. In order to ensure the healthy growth of VM in China, much more effort should be made to widen the application spectrum. Research should be carried out and guidelines published beyond the manufacturing industry.

The use of mathematical techniques at the function analysis stage has been advocated and stressed by many influential Chinese VM authors (Li, 1998; Zou, 1998). Descriptions and illustrations of these techniques often occupy significant portions of VM books (Liu, 1998; Tang and Yang, 1996; Song, 1994). Some of these techniques and their brief descriptions are listed in Table 3. The most important objective of these techniques is to identify poor value areas in a product or project. Discussions with VM practitioners reveal that over-emphasis on the use of these techniques has restricted VM implementation in practice. This is because firstly, most of these techniques were developed by academics and are too complicated to be used by practitioners in the industry. Secondly, these techniques are based on hard systems, focusing on the components of a roduct/project. The most important underlying assumption of these techniques is that the existing value system of the product/project as a whole is correct. This assumption leads practitioners to pay more attention to tactical rather than strategic issues, and hampers the use of VM to resolve high-level problems in China.

Government support made a great contribution to VM development in the late 1980s in China (Shen, 1997). However, promotion based on administrative measures also produced a misunderstanding of VM among some users. In the old planned economy, the government administrative measures significantly affected companies' business. In order to respond to the call of the government, some companies who did not go through proper VM training and had never used the VM methodology, labelled their simple cost-cutting exercise or something else as VM. This practice caused misunderstandings among companies. For example, some wrongly believe that "VM is just another name for traditional cost control".

Table 3 - Major techniques used to identify poor value in China

Techniques	Brief description
ABC	Its underlying principle is Pareto's law of mal-distribution.
Value Index (VI)	VI=FI/CI, where FI is the relative importance of the function(s) realised by a component of a product against the whole function of the product. CI is the relative cost of the component.
Value Graph	A method that presents the Value Index graphically.
Optimal Value Zones	A graphical method developed by Professor Masayasu to help the selection of items for VM study.
Basic Point Method	A method developed by Professor Ma to measure the value of a component based on a known best value point.
Ranking	A method ranking the relative importance of a component with numerical values.
Pair-wise Comparison	A method that determines the relative importance of a component with a pair-wise comparison approach.
Scaling	A method that determines the relative importance of a component with a defined scale range.

In the market economy, government relations with business entities changed considerably. It is up to individual companies to decide what management tools should be used in their business. The promotion of VM applications should be focused on proper training in the VM methodology, practical group problem-solving using VM, and a VM culture in companies, rather than administrative intervention.

Although there are many challenges ahead, opportunities also coexist for VM development in China. Under the rules of the WTO, China is to give all WTO members non-discriminatory access to the market and will gradually withdraw protection of its national industries in the near future. This will result in increasing worldwide competition for China's business. One of the ways to cope with this intensifying competition is to reduce product price to obtain a competitive edge in the open market. The low prices will subsequently lead to a pressing demand to reduce the cost of the products. Another strategy is product differentiation – i.e. creating products that are different from the competitors and are perceived as value for money products by the customers. As an effective method in cost reduction and value enhancement, it is anticipated that VM will win more attention and usage from industries.

The new situation provides more opportunities for local practitioners. However, globalisation and the market economy are still new concepts for many Chinese companies and individuals. The local experience of applying VM in the new environment of market economy is very limited. Because of this, cooperation with overseas VM practitioners is perhaps a commendable way to promote VM applications in China. This may create a win-win situation for both overseas VM practitioners (who can extend their work field) and China's VM practitioners (who can learn something from communication with outside partners). In order to keep up with the rapid changes in the business environment, many Chinese are very keen to equip themselves with modern management techniques. A large number of people have unprecedented desire to obtain internationally recognised professional qualifications. This provides a good opportunity for overseas VM institutions to carry out VM-related training and certification in China.

CONCLUSIONS

This paper reveals the current state of VM application in China based on a questionnaire survey conducted in the construction and manufacturing industries. The manufacturing industry is the most active and influential field of VM applications in China. The difference between the Chinese and overseas VM practice reveals areas for improvement in China's VM development. Our research identified the top three difficulties encountered by China's VM practitioners. The prospect of VM in China is promising after China's access to WTO, but necessary actions must be taken to face the challenges such as the limited scope of current applications, over-emphasis on mathematical techniques, and inappropriate promotion measures. Cooperation with overseas VM

institutions and practitioners may allow China's VM practitioners to improve their practices. At the same time, it creates opportunities for overseas VM practitioners to extend their business into China.

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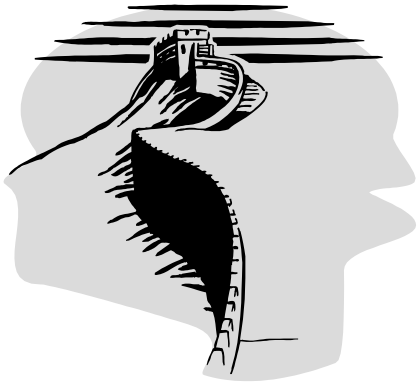

PHOTOS TAKEN AT THE 6TH INTERNATIONAL CONFERENCE: A WORLD OF VALUE

26-27 November, 2003
Hong Kong Conventional and Exhibition Centre, Hong Kong

Welcome speech by the President of HKIVM

Welcome speech by the Conference Director

Souvenir presented to the Keynote Speaker

Physical exercise at the conference

Welcome dinner at the Hong Kong Jockey Club

Farewell dinner at the Dynasty Club

HKIVM NEWS

- **26 September 2003**, HKIVM lunch meeting was organised in Hong Kong Club. Anne Copeland Chui gave her insight into facilitation and consensus building. The key to this is to start earlier (usually much earlier than most people think), to build teamwork and a sense of contribution of the participants. The event was very well received by the audience.
- **3 November 2003**, HKIVM lunch meeting was organised, Prof. Peter Brandon of University of Salford was invited to give a presentation on future direction of the construction industry in the UK. The event was attended by more than 20 members and guests and the presentation was very well received by the audience.
- **10-12 November 2003**, Beijing International Value Engineering and Management Conference, Development of Value Engineering and Management: China and World, hosted by the Value Engineering Society of Beijing and China Mechanical VE Society, was held in Beijing. Our Secretary Geoffrey Shen was invited to present at the conference.
- **26-27 November 2003**, Our 6th International VM Conference: A World of Value was organized in the Hong Kong Convention and Exhibition Centre. This successful event attracted speakers and delegates from more than ten countries around the world. Please visit HKIVM website at http://www.hkivm.com.hk for photos taken at the conference.

FORTHCOMING EVENTS

- **17 December 2003**, HKIVM's 8th Annual General Meeting and Christmas Lunch, 12:00 noon for 12:30pm, Hong Kong Club, 1 Jackson Road, Central, Hong Kong.
- **12-15 July 2004**, SAVE International's 44th annual conference**,** *Strategies and Techniques to Enhance Value*, Wyndham Montreal, Montreal, Quebec. For more details, please visit the following website: http://www.value-eng.org/education_conference.php

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