

# Value Engineering in Developing Countries

Eng. Abeer Khalid Mansour, and Dr Mohammed Abueusef

**Abstract**—Conservation in Civil Engineering Construction is a familiar phenomenon, so most of the Civil Engineers prefer to reduce the unnecessary cost whenever possible without affecting the system. To achieve this, value engineering is the most economical and penetrating tool. Value engineering is a philosophy implemented by the use of a specific set of techniques, a body of knowledge and a group of learned skills; it is an organized creative approach of identification of unnecessary cost.

**Keywords**—Quality aspects of a project, requirements management, value analysis, value engineering.

## I. INTRODUCTION

VALUE Engineering Can be characterized as a composed methodology to the distinguishing proof and disposal of unnecessary expense. Unnecessary expense is Cost which gives not one or the other utilization, nor life, nor quality, nor appearance, nor client characteristics [1].

The Value analyses applied to Civil Engineering, construction applications, mainly focus on the reduction of unnecessary cost and improves the construction technique, this in turn contributes to the management, builders and owners which can be used to provide better facilities.

There are numbers of the definition given by the different expertise and practitioners of these techniques, and some of them are as mentioned below:

- Dell'Isola (1997) "An organized process with an impressive history of improving the value and quality".
- Hayles and Simister (2000) "Proactive, creative, team approach to problem-solving in construction projects to provide the best value for money".
- Kelly (2004) "The process of identifying and eliminating unnecessary cost during design and construction stages".
- JSVE (2005) "A professionally applied, the function-oriented, systematic team approach used to analyze and improve
- value in a product, facility design, system or service" [1].

Abeer Khalid Mansour Hamed, Islamic university Malaysia, Sudan  
abeerkhalid37@hotmail.com  
Dr Mohammed Abueusef, abueusuf@iium.edu.my.

## II. VALUE ENGINEERING CONCEPT

From the beginning the concept of value engineering was seen to be cost validation exercise, which did not affect the quality of the product. The straight omission of an enhancement or finish would not be considered value engineering. Value engineering is a methodology used to analyze the function of the goods and services and to obtain the required functions of the user at the lowest total cost without reducing the necessary quality of performance. For VE to be effective, the design of the organization structure shall be such that constant interaction between engineering, construction and procurement process is enabled and the approach should be project-based design approach [2].

Value Engineering is used at the design stage of a product or process in order to avoid unnecessary cost. Just as VE can be applied across all stages of the decision making process, so it can be used to reduce costs across a vast range of functions and systems.

One of the key challenges in this growing industry is member turnover – or the need to replace members who no longer see value in the monthly membership dues. Optimum Value Engineering is the process of comparing alternative materials and methods to determine the least costly combination that will result in the desired end product. Similarly, at an operational level, value studies generally focus on those areas where significant cost benefits can be realized:

- High value, volume and waste of both products and processes

These opportunities can be identified during brainstorming sessions, through customer feedback or, as is most often the case, by individuals who recognize a potential opportunity for reducing costs within the scope of their own work environment.

### When Can Value Engineering Be Used

- Determining the best design alternatives for Projects.
- Reduction of cost on existing Projects.
- Improving quality, increase reliability and availability, and customer satisfaction.
- Enhancing organizational performance.
- Improving the work scheduling
- Reduction of risks
- Value Engineering is a powerful tool used to identify problems and develop recommended solutions[3].

The figure below ensures the concept of value engineering

and management suitability to be implemented at any stage of the project.

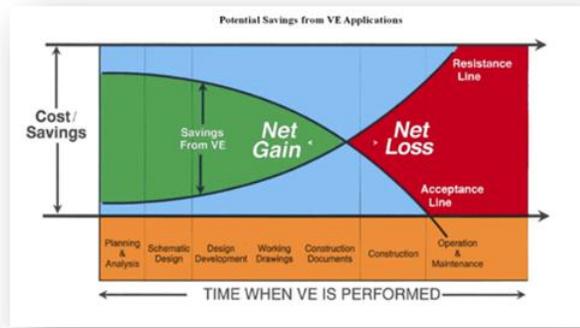


Fig. 1

### III. BENEFITS OF VALUE MANAGEMENT

Benefits of a Value Management Study are as follows [1].

- Cost Optimization: Value Management (VM) or Value Engineering (VE) is measuring its results by measuring Value being the end result of doing something functionally correct for the least cost.
- A better understanding of the needs and the functions necessary to meet those needs
- A better definition of program or project objectives
- A better definition of quality and performance standards
- Clearer briefs
- Reduced wastage of resources
- Capital fund savings
- Improved operational efficiencies
- Team building and strategies which
- Create a climate of shared understanding
- Reduce conflict and risks
- Foster joint ownership of problems and solutions
- Create new ideas for improved outcomes
- Enhance the skills of the participants
- Save on project development time and ultimate service delivery to the community

As a direct result of involvement in the structured workshop process, participants generally achieve a better overall understanding of the project. In many cases there can be a major transformation of perceptions. Communication and networking can be enhanced through the workshop process. This, in turn, can have a significant impact throughout the program planning and project development processes.

### IV. VALUE ANALYSIS STEPS

The first step in a Value Analysis is to create a Value Methodology Job Plan. The model used by SAVE (Society of American Value Engineers) International has six phases :

1. The **Information Phase** involves assembling all available information about the project to develop a better understanding of what is involved.

2. The **Function Analysis** phase involves describing in detail the function of every Component of a project to develop a detailed understanding of what the project is supposed to accomplish.
3. The **Creative Phase** is a brainstorming effort that examines as many alternate ways as Possible to achieve the function of the project.
4. The **Evaluation Phase** examines all of the ideas generated during the creative phase and narrows them down into feasible alternatives.
5. The **Development Phase** takes the most feasible alternatives and prepares information such as sketches, narratives and specifications to improve the value of the project.
6. The **Presentation Phase** involves presenting the value recommendations to the Stakeholders of the project[1].

The above phases provides a proof that value engineering can be a very flexible tool and quite straightforward to implement in the construction project no matter how simple or complicated the project phases and components .These are also reflected in the figure below.

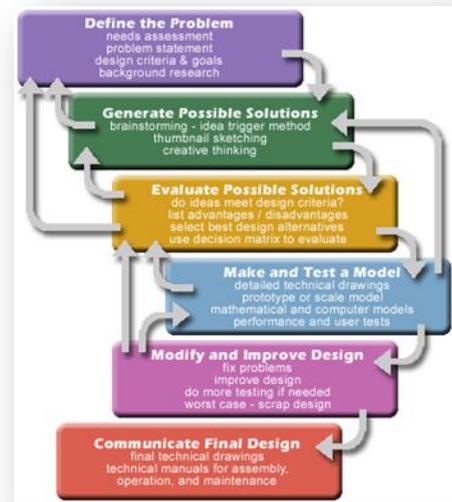


Fig. 3

(Source :<http://engineering.tufts.edu/ggs/designprocess.gif>)

### V. VALUE ENGINEERING IN DEVELOPING COUNTRIES

The catalogue of problems which face the construction industries in developing countries is well known; these problems are a result of poor performances in projects that are undertaken in these countries (Ofori,2000) , the following table gives a clear example that value engineer can easily provide an increase in the performance of these projects in

addition to money savings.

TABLE I  
APPLICATION OF VALUE ENGINEERING ON DIFFERENT CONSTRUCTION  
PROJECTS IN INDIA (TABLE I)

PROJECT	Findings and Savings
Seven storey building of the Institute of Pathology, New Delhi by CPWD Project	<ul style="list-style-type: none"> <li>• Saving of 9.2 lakhs i.e. about 8% of the total project cost.</li> <li>• Some changes have been increase the circulation space so it was utilized in the laboratory and other uses-increasing functional-ability without the use of other resources.</li> <li>• And many more recommendations in design and etc.</li> </ul>
Police housing Scheme at Delhi	<ul style="list-style-type: none"> <li>• Optimum use of interior space was analyzed by the team by making adjustments of layout of rooms and in turn the livable area was increased by about 4 %.</li> <li>• Improvement in specification has made which cost additional 12.80 lakhs, which was about 2.4% of the project cost, but this cost provides long term benefits by way of saving in life cycle cost.</li> </ul>
Higher secondary school Building in Najafgarh, Delhi	<ul style="list-style-type: none"> <li>• Total cost saving of the project was Rs.11.87 lacks, which was 6.6 % of the total project cost.</li> <li>• Improvements in the some of the finishing items were improved.</li> </ul>
Hiranandani Gardens Residential complex at Powai, Bombay.	<ul style="list-style-type: none"> <li>• In this project the cost saving is about 8-10% of total project cost.</li> <li>• With this VE project, it became possible to deliver the project on time with the highest quality.</li> </ul>
Large building complex on the north of the Mehrauli Badarpur road in Delhi.	<ul style="list-style-type: none"> <li>• Architecture, planning has been modified at eight-storied blocks with two basements.</li> <li>• This decision helps in reduced cost, Optimum utilization of site adhering to the maximum permissible FAR, ground coverage regulations and parking space.</li> </ul>

In all these projects, application of value analysis is applied to the different stages of the construction project like: Design stage, Architectural design stage, Structural design stage, Execution stage and so on [4].

The above presented a summary of VE on some of the projects in India clearly state the impact in the terms of capital saved or improved function-ability and use-ability of the project at the same cost, and hence an approximation can be made about how much amount can be saved from the construction industry in coming future which would be unnecessarily been wasted to achieve the stated functions of the project. India is a developing country and the financial aspect plays a very important and crucial part and hence even a small percentage of capital saved from the construction sector, which involves a huge amount, can be diverted and used in various other sectors for the overall development of the nation,

which is almost the same scenario in other developing countries.

## VI. CONCLUSIONS

The speculation on the development part and foundation advancement of India, expresses the criticalness and key part of the development business. Once more, separated from the enormous sum related, the development area has verities of development ventures, including an expansive number of stakeholders, materials, development and administration methods, et al. Which expresses a more extensive extent of use of the worth designing/administration.

Considering the qualities of the Indian development industry, it would be conceivable through VE studies to distinguish and defeat the different escape clauses with imaginative plan B which will bring about higher profit, cost lessening, better execution, better quality, straightforward configuration (Civil, structural, mechanical, and so forth.) and ideal task span without influencing the capacity of any venture or administration[5].

- **Value engineering/value analysis creates cost and quality consciousness among the employees.**
- **It helps employees in better understanding of their jobs.**
- **Value engineering reduces cost of the product, it is because of special attention which is paid for simplification, standardization and improved method of production.**
- **Provides information to management regarding function wise expenditure on the product under investigation.**
- **Quality is maintained at the desired level because there is no question to reduce costs at the expense of quality.**
- **Value analysis helps to blast away such road blocks as “It won’t work”, it is impracticable”, “why change it, when it works?”, etc.**
- Dilutes resistance to change and accelerates the process of implementation.
- **The functionality of the project is often improved as well as producing tremendous savings, both initial and Life-Cycle Cost.**

## REFERENCES

- <http://www.ijaiem.org/volume2issue12/IJAIEM-2013-12-04-007.pdf>
  - <http://www.mastermasoncpm.com/Downloads/1-Value%20Engineering>.
  - <http://www.sdn.sap.com/irj/sdn/go/portal/prtroot/docs/webcontent/uid/e076c374-75e9-2a10-6b90-cafeaed6eab4>
  - <http://engineering.tufts.edu/ggs/designprocess.gif>
- [1] Value engineering: A how to manual by S. S. Iyer.  
[2] A REVIEW ON VALUE ENGINEERING TECHNIQUES IN INDIAN CONTEXT:NEETU B. YADAV1, RAKESH KACHA2, NEERAJ D. SHARMA3 & HIREN A. RATHOD41,2M.E.Student (Construction Management), S.N.P.I.T. & R.C, Umrakh, Bardoli, Gujarat, India.  
[3] Value Engineering in Government and Private Sector Construction: William J. Simpkins UNIVERSITY OF FLORIDA

- [4] VALUE ENGINEERING FOR SMALL TRANSPORTATION PROJECTS: by Jennifer Anne Clark.
- [5] Case study: An Introduction to VALUE ANALYSIS AND VALUE ENGINEERING for Architects, Engineers, and Builders By Muthiah Kasi, C.V.S. Senior Vice President Alfred Benesch & Company, Chicago, Illinois.
- [6] CASE STUDY: Value Engineering Report Ordot Dump Closure, Guam TG Engineers, P.C. & Value Management Strategies, Inc.

When you always do what you have always done -you always get what you have always gotten.----Socrates