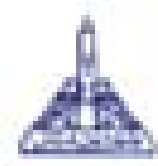


**Ain Shams University  
Faculty of Engineering  
Structural Department**



## **Value Engineering Modeling in Administrative Buildings**

**A Thesis Submitted to the Faculty of Engineering in  
Partial Fulfillment of requirements for the degree of  
Master of Science in Construction Project  
Management**

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## إستخدام هندسة القيمة في عمل نماذج لإختيار بدائل إنشائية للمباني الإدارية

خطة بحثية مقدمة كجزء من متطلبات الحصول على درجة الماجستير

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## **Abstract**

**The Construction Industry is considered a major sector that plays a vital role in the economic growth of nations. However, inherently construction projects incur risks of cost and time overruns impacting both budgets and delivery dates. Value Engineering is considered an important tool, if properly used, will counter these inherent construction risks without jeopardizing project functions.**

**The objective of the research is to develop a Value Engineering Model which can be used as a tool to achieve the best return on investment for structural building systems. The research demonstrates that the newly developed model is deployed in the value engineering study. It furthermore presents an evaluation and assessment of current Value Engineering practices for the construction industry in Egypt, by Investigates current Value Engineering practices.**

**The research provides substantially comprehensive sequenced models that combine and consolidate the value engineering phases into a practical and applicable set which facilitate and promote the implementation of the Value Engineering study. The main contribution of this research is “The Function Based Breakdown Structure (FBBS)” that can be used to analyze and classify the functions of the detailed components into Basic, Secondary and Required Secondary functions associated to its costs. This will enable management to further examine the possible consequences and the impacts that may occur from eliminating the secondary functions and determine other ways or alternatives to achieve the project objectives with respect to its constraints (Function, Time, Cost and Quality).**

**The construction of an office building is used as a case study to validate the research by selecting the optimum structural system utilizing the developed Value Engineering Model. A Questionnaire is used to understand the current applications of Value Engineering, what is the category level of the organizations that are concerned to apply value engineering.**

**Finally, an assessment is made identifying problems hindering the use of Value Engineering methodologies and means of activating proper processes and scientific procedures in the Egyptian engineering and construction sector.**

**Keywords**

Construction Industry, Value Engineering Phases, New VE Model, Structural System, Office Building, Function Breakdown.

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## Table Of Contents

### **Chapter 1 - Introduction**

1.1 General .....	1
1.2 Problem Statement .....	3
1.3 Methodology .....	3
1.3.1 Main Objective .....	3
1.3.2 Supporting Objectives .....	4
1.4 The literature review .....	4
1.4.1 Need for Value Engineering .....	5
1.4.2 Early work of Value Engineering .....	5
1.5 The Value Engineering Methodology .....	6
1.6 Practical application .....	7
1.7 Research Structure & Methodology .....	7

### **Chapter 2 - Administrative Buildings**

2.1 Architectural attributes .....	9
2.1.1 Types of Spaces .....	9
2.1.1.1 Offices .....	9
2.1.1.2 Employee/Visitor Support Space.....	9
2.1.1.3 Operation and Maintenance Spaces .....	9
2.1.2 Important Design Considerations .....	9
2.1.2.1 Cost-Effectiveness .....	9
2.1.2.2 Functional and Operational Considerations ...	10
2.1.2.3 Flexibility .....	10
2.1.2.4 Urban Planning .....	10
2.1.2.5 Productivity Environment .....	11
2.1.2.6 Technical Connectivity .....	12
2.1.2.7 Security and Safety .....	12
2.1.2.8 Sustainability .....	13
2.1.2.9 Modernization .....	13
2.1.3 Space Attributes .....	13
2.1.3.1 Introduction .....	14
2.1.3.2 Accounting for Functional Needs .....	14
2.1.3.3 Ensuring Appropriate Systems Integration....	14
2.1.4 Meeting Performance Objectives .....	14
2.1.4.1 Relationship of Function, Operation and Cost.	15
2.2 Structural Engineering Systems .....	15
2.2.1 Introduction .....	16
2.2.2 Considerations .....	16
2.2.2.1 Flexibility .....	17
2.2.2.2 Material Delivery and Construction Timing...	18
2.2.2.3 Ease of Construction and Schedule .....	18

## **Table Of Contents Continued**

2.2.2.4	Cost of the Selected System .....	18
2.2.2.5	Cost Impact on other systems .....	18
2.2.2.6	Appearance and Aesthetics .....	18
2.2.3	Structural System Types .....	18
2.2.3.1	Concrete Foundation Systems .....	18
2.2.3.2	Structural Stud .....	21
2.2.3.3	Bearing Wall and Concrete Plank .....	21
2.2.3.4	Steel and Concrete Plank .....	21
2.2.3.5	Steel and Poured-Concrete Deck .....	23
2.2.3.6	Precast Concrete .....	23
2.2.3.7	Beam-and-Slab .....	24
2.2.3.8	Flat-Slab .....	24
2.2.3.9	Post-Tensioned Concrete Slab .....	24
 <b>Chapter 3 - Value Engineering Fundamentals</b>		
3.1	Introduction .....	26
3.2	Value Engineering Terminology .....	26
3.2.1	Function .....	26
3.2.2	Value .....	26
3.3	Principles of Value Engineering .....	27
3.3.1	Introduction .....	27
3.3.2	Value Engineering concepts .....	28
3.3.3	Overall Objectives of Value Engineering .....	28
3.4	First steps of Value Engineering .....	29
3.4.1	Introduction .....	29
3.4.2	Value Engineering milestones .....	30
3.4.3	SAVE .....	30
3.5	Development of Value Engineering .....	31
3.5.1	Introduction .....	31
3.5.2	Global development of the Value Engineering .....	32
3.5.3	Who influence the costs? .....	32
3.6	Features of the Value Engineering .....	34
3.6.1	Introduction .....	34
3.6.2	Meeting project value objectives .....	38
3.6.3	The reasons for unnecessary cost .....	39
3.6.4	When to apply Value Engineering .....	41
3.7	Criteria for Selecting When to Conduct Value Engineering Study .....	44
3.7.1	Efforts conducted in Value Engineering .....	45

## **Table Of Contents Continued**

3.7.2 The impact of decision makers.....	47
3.8 What Value Engineering is or is not .....	50
3.8.1 What Value Engineering is .....	50
3.8.2 What Value Engineering is not .....	50

### **Chapter 4 - The Value Engineering Frame Work**

4.1 Introduction .....	51
4.2 Function .....	53
4.2.1 Establishing Function Worth .....	53
4.2.2 Selecting Functions for Study .....	53
4.3 Defining quality as part of value .....	53
4.3.1 Value managing quality to deliver best value .....	54
4.4 The Value Management Hierarchy .....	56
4.5 Life Cycle Cost .....	58
4.5.1 Introduction .....	58
4.5.2 Definition of Life cycle cost .....	59
4.6 Life Cycle Costing Guidelines .....	59
4.6.1 The Economic Analysis Concept .....	60
4.6.2 Cost Elements .....	62
4.6.2.1 Initial Costs .....	62
4.6.2.2 Annual Recurring costs .....	62
4.6.2.3 Nonrecurring Cost .....	62
4.7 Value Engineering application to Risk .....	63
4.7.1 Risk – Value Relationship .....	63
4.7.2 Distinct stages of Risk management .....	64
4.7.2.1 Risk identification.....	64
4.7.2.2 Risk analysis .....	64
4.7.2.3 Risk response .....	65
4.7.2.4 Risk register and action planning .....	65
4.7.2.5 Change management .....	66
4.8 Value Engineering in FIDIC .....	67

### **Chapter 5 - The Job Plan**

5.1 Introduction .....	69
5.2 Pre-study .....	70
5.3 Workshop .....	70
5.2.1 Information Phase .....	70
5.3.2 Function analysis Phase .....	74
5.3.2.1 Function analysis steps .....	74
5.3.2.2 Determine functions .....	74



## **Table Of Contents Continued**

5.3.2.4	Categorizing Functions .....	74
5.3.2.5	Function Analysis System Technique (FAST Diagram) .....	75
5.3.3	Creativity phase .....	77
5.3.3.1	Creative Concepts .....	77
5.3.3.2	Stimulus for other ideas. ....	77
5.3.4	Evaluation phase. ....	79
5.3.5	Development phase .....	79
5.4	Post study .....	79
5.4.1	Implementation .....	80

## **Chapter 6 - Function Based Breakdown Structure (FBBS)**

6.1	Introduction.....	81
6.2	Methodology .....	82
6.2.1	Function Analysis .....	83
6.2.2	Work breakdown structure (WBS) .....	83
6.2.2.1	Definitions .....	84
6.3	Cost-function relationships .....	87
6.4	FAST diagram & WBS .....	87
6.5	Function Based Breakdown Structure (FBBS).....	88
6.6	How to apply FBBS .....	90
6.6.1	Verification of FBBS Model .....	90
6.7	When to apply FBBS .....	94
6.8	Supporting Needs to apply FBBS effectively .....	98

## **Chapter 7 - Case Study**

7.1	Introduction .....	99
7.2	Main objectives .....	100
7.3	Pre-Study Preparation .....	100
7.3.1	Quality Model .....	100
7.3.2	Cost Model .....	102
7.3.3	Study phases .....	103
7.3.3.1	Information Phase .....	103
7.3.3.2	Function analysis Phase .....	103
7.3.3.2.1	Cost / Worth .....	103
7.3.3.3	Creativity Phase .....	109
7.3.3.4	Evaluation Phase .....	111
7.3.3.5	Development Phase .....	114

### **Table Of Contents Continued**

#### **Chapter 8 - The Value Engineering Application Investigation**

8.1 Introduction .....	122
8.2 Methodology .....	122
8.3 The Questionnaire Goals.....	122
8.4 Design Sample Size.....	122
8.5 Data Collection.....	125

#### **Chapter 9 - Conclusions & Recommendations**

9.1 General .....	136
9.2 Research Conclusions .....	136
9.3 General Conclusions from Survey Results.....	137
9.4 Recommendations .....	138
9.5 Recommendations for Future researches.....	139
9.6 General Recommendations .....	139

## List of Figures

### **Chapter 1**

Figure (1-1)	Research Structure & Methodology.....	8
--------------	---------------------------------------	---

### **Chapter 2**

Figure (2-1)	Deep foundation installation .....	20
Figure (2-2)	Steel and Concrete Plank .....	22
Figure (2-3)	Precast Concrete .....	23
Figure (2-4)	Prestressed and Post-Tensioned Concrete .....	25

### **Chapter 3**

Figure (3-1)	Who influence the costs .....	33
Figure (3-2)	Decision making team .....	36
Figure (3-3)	Responsibility Assignment Matrix .....	37
Figure (3-4)	When to apply Value Engineering .....	42
Figure (3-5)	Cost of changes.....	43
Figure (3-6)	The potential benefits .....	44
Figure (3-7)	Efforts conducted in Value Engineering .....	46
Figure (3-8)	Who are decision makers .....	47
Figure (3-9)	The impact of decision makers .....	48
Figure (3-10)	Decisions influence .....	49

### **Chapter 4**

Figure (4-1)	Value Engineering Integration into Design .....	52
Figure (4-2)	Maslow's individual hierarchy .....	56
Figure (4-3)	Value Engineering hierarchy .....	57
Figure (4-4)	The Economic life span .....	61

### **Chapter 5**

Figure (5-1)	The Job plan .....	69
Figure (5-2)	Value Engineering phases .....	72
Figure (5-3)	Pareto Law .....	73
Figure (5-4)	FAST Diagram .....	76
Figure (5-5)	Stimulus for other ideas .....	78

### **Chapter 6**

Figure (6-1)	Work breakdown structure (WBS) .....	84
Figure (6-2)	Schedule activities .....	86
Figure (6-3)	Function Based Breakdown Structure (FBBS).....	89
Figure (6-4)	FAST Diagram for RC Foundations .....	92
Figure (6-5)	FBBS Model .....	93
Figure (6-6)	Schedule activities for Arc. Works .....	96
Figure (6-7)	FBBS Model for Arc. Works .....	97

### **List of Figures Continued**

#### **Chapter 7**

Figure (7-1)	Quality Model .....	101
Figure (7-2)	Cost Model .....	102
Figure (7-3)	Fast Diagram .....	104

## **List of Tables**

### **Chapter 7**

Table (7-1)	Function Classification .....	105
Table (7-2)	Cost Worth Model .....	106
Table (7-3)	FBBS PC Footings .....	107
Table (7-4)	FBBS RC Footings .....	108
Table (7-5)	Screening ideas model .....	110
Table (7-6)	(QBS) for foundations .....	111
Table (7-7)	(QBS) for columns .....	112
Table (7-8)	(QBS) for slabs .....	113
Table (7-9)	Advantages and disadv. of shallow foundations ...	114
Table (7-10)	Advantages and disadv. of raft foundations .....	115
Table (7-11)	Advantages and disadv. of columns .....	116
Table (7-12)	Advantages and disadv. of steel frames .....	117
Table (7-13)	Advantages and disadv. of flat slabs .....	118
Table (7-14)	Advantages and disadv. of ribbed .....	119
Table (7-15)	Advantages and disadv. of post- tensioned slabs...	120
Table (7-16)	Life Cycle Cost Summary .....	121

### **Chapter 8**

Table (8-1)	Sample Size.....	124
	Questionnaire Histograms .....	125-135

### **References**

I	Books .....	140
II	Papers .....	141
III	Thesis & Dissertations .....	142
IV	Web Pages .....	142

### **Appendices**

Appendix A:	Research Questionnaire.....	A1-A7
Appendix B:	Survey Data Sheets .....	B1-B16
Appendix C:	VE Modeling Forms .....	C1-C30
Appendix D:	Present Worth Tables.....	D1-D5

### **1.1 General**

**The Egyptian Market is considered one of the most promising and hopeful markets in recent years. Despite the current global financial crisis, practitioners confirm that “Egypt” is becoming one of the major focal points and one of the most attractive markets in the Middle East and the North African region for the next years. This remains the case even after the January 2011 events and expected changes.**

**Investor sentiment in real-estate in Egypt is increasing. According to Jones Lang LaSalle's Real-Estate Investor Sentiment Survey released in April 2010 ' Egypt is now second only to Saudi Arabia. Egypt has a large and rapidly growing population, a growing economy, high regional demand and an increasing supply of premium commercial property. All real estate sectors are in the upturn stage of the property market cycle. There is strong demand, and the expectation of further rental and price growth in 2010 and beyond. [42]**

**Despite the global economic downturn, the real estate market in Egypt has remained largely stable. Demand for real estate in Cairo is expected to continue rising, but at a lower rate than in 2006-2008, when overoptimistic speculation and the search for yields took over. Demand in the Cairo market is cash-driven and directed by the end-user, as opposed to being mortgage-dependent and/or speculative. In the office and retail sub-sectors, rents and capital values have been increasing during the year across five provinces (Cairo, Alexandria, 6th of October City, New Cairo and Giza), as yields have fallen. In the less active industrial sub-sector, rents and yields have shown little movement.**

**There has been a significant increase in the supply of commercial property, including new city developments to the east and west of Cairo, as well as projects in Cairo. This activity is rectifying the long-standing problem of under development in these areas. Demand is on the increase as more western multinational companies set up bases in Egypt, and as more Middle Eastern companies relocate to Egypt, often because of adverse conditions in other regional countries, such as Dubai and Lebanon. As a result, market conditions are dynamic. Vacancy rates are generally low or falling.**

**The office and retail sub-sectors can expect double-digit increases in rentals in 2011, with smaller increases over the following years.**

**The Egyptian economic growth was 4.7% in FY09/10. In 2010/11 this will rise slightly to 4.9%. In 2011- 2014, growth forecast exceeds 6%. It is expected that the Egyptian government will continue to assist the economic recovery by maintaining an expansionary fiscal policy. While the fiscal deficit will widen in absolute terms in the short term, over the longer term, the fiscal position will improve after a slowdown in spending, outpaced by the growth rate recorded by revenues. [43]**

**Legislation of a special law in Egypt that allows foreigners to own and possess land, housing units and buildings (Law 56 for 1988) was a crucial event that helped in attracting foreign investors. As a consequence of these rules and regulations, the Egyptian governments favorably advocate to defeat obstacles, barriers and to facilitate routine procedures, which previously were considered as the most negative obstructions toward the direction of investment in Egypt. [44]**

**Furthermore, some of the subsidiary laws were issued to captivate investors, assisted them to create the kind of assurance and provide confidence for both the Arab investors and foreign alike, which had a significant outcome in investing billions of dollars in the Egyptian economy. Therefore, due to the necessity for these enormous entities and popular names in all different industries to be as close as possible to its investment, whether it is in construction or communications, petrochemicals, infrastructure, etc.....**

**Utilizing properly planned and dedicated commercial office space instead of mixing commercial, retail and residential space reflects civilized growth of any country all over the world, and consider the most perceivable indicator of economical, cultural, social, technological, and financial progress. Administrative Buildings are the most tangible reflection of a profound change in employment patterns that has commonly taken place over the last ten years in Egypt.**

**According to many of statistics, the life-cycle cost distribution for a typical service organization is about 3 to 4 % for the facility, 4 % for**