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Design-Construction Interface Problems in Building Construction Projects in Egypt: Impacts and Minimization

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الملخص العربي:

تهتم صناعة التشييد والبناء بتلبية حاجات عمالئها من خلال تنفيذ مشروعات تحقق اهدافهم وتلاقي توقعاتهم وتتميز تلك المشروعات بانها تنجز في الوقت المحدد و في حدود الميزانيات المرصودة لها وحسب معايير الجودة المطلوبة. علي الرغم من برامج الاسكان العديدة التى تنفذها الجهات الحكومية المختصة الا انه هناك مشكلة حقيقية لاسكان الفقراء، وترجع هذه المشكلة لعدد من الاسباب من بينها عدم قدرة ذوي الدخل المنخفض علي تغطية تكلفة هذه المساكن بالاضافة الي عدم قدرة تلك المساكن على ارضاء حاجة مستخدميها. من هنا تبرز الحاجة الى تطوير حلول ابداعية ومبتكرة تستطيع إنجاز مشروعات سكنية تنال رضا مستخدميها وبتكلفة اكثر فاعلية في آن واحد وذلك من خلال دمج مفاهيم هندسة القيمة والازمات في عملية تطوير مشروعات الإسكان المنخفض التكاليف. ويحاول هذا البحث انجاز ثلاثة اهداف رئيسية:اولا: مراجعة الادبيات فما يتعلق بالتطور التاريخي لمشروعات الاسكان ومفاهيم رضا العميل وهندسة القيمة والازمات في صناعة البناء، ثانيا: تحديد إمكانيةهندسة القيمة والازمات ومزاياهما في تطوير مشاريع الاسكان المنخفض التكاليف. ثالثا: تقديم بعض الدروس المستفادة من مجموعة من الحالات الدراسية لمشاريع ذوي الدخل المنخفض في مصر. وأخيرا وضع عدد من التوصيات الهامة للجهات الحكومية والمؤسسات التصميمية والمهتمين بقضاياالاسكان المنخفض التكاليف

Abstract:

The construction industry is concerned with satisfying its customers' needs through delivering projects that achieve their objectives and meet their expectations on time, within budget and as specified. Despite the several housing programmers constructed by government authorities, there is a real housing problem for the poor. This problem is attributed to a number of reasons. Amongst them, the inability of the low-incomers to cover the cost of supplied houses and the lack of the constructed projects to achieve users' satisfaction. This highlighted the need to develop innovative and creative solutions that can deliver housing projects that achieve the satisfaction of their users and at the most-cost effective manner simultaneously. This aim will be achieved through incorporating the concepts of Value Engineering and Risk Management in developing housing projects for the poor. Towards this aim, this paper attempts to accomplish three main objectives. Firstly, reviewing the historical development of housing projects, the concepts of customer satisfaction, VE and RM in construction. Secondly, identifying the capability of VE and RM and their benefits for developing housing projects for the poor. Thirdly, presenting learned lessons extracted from case studies of low-income housing projects constructed by the government of the Egypt. Finally, outlining the research recommendations for government authorities, design firms and construction professionals concerned with housing projects for the poor.

Key words- Value Engineering, Projects Management Time costs qualities relationships, constructions project in Egypt, Low Cost Housing Projects.

I. INTRODUCTION

The Value Engineering were intensives, interdisciplinary problems solving activities that focus on improving the values

Of the function that were required to accomplish the goals, or objectives of all products, processes, services, or organizations. Value Engineering stand to a reasons that all techniques so useful must be applied to all products, and at any stages of the normal day-to-day developments of a buildings constructions products. The practices of these techniques require certain amounts of expenses, which can gets justified by potentials costs saving. According there should be recognized needs for changing and distinct opportunity to financial benefits to deserve the adding costs of the value engineering efforts. Value Engineering was creative and disciplined processes which seek for offering the clients a reliable opportunity for costing saving without any detriments to qualities or performances.

II. HISTORICAL BACKGROUND

During the World War II, General Electric Company face the problems of scarcities of critical material to fulfill

These demands of the wars equipment. For overcoming those problems, GE has to use substituted material for these in shortages. A lot of this substitute was less expensive and quality in performances. In 1947, Lawrence D. Mile, the staffs engineer for GE developed the number of idea and technique for selecting alternatives material that might be use internationally. Main attitudes were for searching for value in a products and he develop the functions-based methodology that were proven successfully. The new methodology is successful it is possible for producing well at greater productions and operational efficiency and at lower cost. As results of its successes, GE formed special groups leading by Larry Miles for refining the methodology. In 1954, the U.S Navy Bureau of Ship uses the Value Analysis processes to cost improvements during designs. It was called "Value Engineering". The Value Engineering is used formally in the U.S Departments of Defenses in 1960.

III. VALUE ENGINEERING BENEFITS

According to researches carried out by SAVE, VM methodology May increases customer's satisfactions and adding values to organization's investments in all business or economics settings. Practitioners apply VM methodology to product and in industry as the followings: corporation and manufacturing, constructions, transportations, governments, healthy caring and environmental engineering. Further than the researches they find out the VM methodology easily produce saving of 35 % of the estimate costs to manufacture a product, constructing the projects or providing the services. The returns on investments that publics and privates organization derives from implementing VM program average 10 to 1. That was, for all dollars invested in the VM studies, including participants' times and implementations cost, 10 dollar in net saving result.

IV. VALUE ENGINEERING METHODOLOGY

The value methodology was these systematic processes that follow the Jobs Plans. The Jobs Plans consist of some phases, the recommend VE methodology (Job Plan) used by the VE teams during the Workshops had five distinct phases. Briefly, those phases were:

A. Information Phase

The VE teams gain as more information as possible about the projects designs,

backgrounds, constraint, and projected cost. The teams perform the function analysis and relatives costs rank of system and sub-system to identify potentials high costs area. The information phases include preparations of these costs and energy model from costs information assemble before workshop began. The models were updated based on data received during the Designers presentations.

B. Function and Creative Phase

The VE teams use creative group's interactions processes to identify alternatives idea to accomplish the functions of the systems or sub-systems. Functional analysis force broader and much comprehensives understanding of the projects by
Stimulating intense discussions and by compelling the teams to view aspect they could not have considered VE
Teams evaluate the idea develop during the creative phases.

C. Evaluation/Analytical Phases

The idea generates during Speculative/Creative Phases were screened and evaluated by the teams. The idea showing the great potentials for costing saving and projects improvements were selected for further studies. VE teams evaluate the idea developed during the creature's phases. The VE teams rank the idea. Idea found to be irrelevant or not worth of additional studies was disregarded; this idea that represents the greatest potentials for costing saving and improvement were selected to the development.

D. Development/Recommendation Phase

The VE team's research selected idea and prepare description, sketch and life cycles costs estimate for supporting the recommendation as formal VE proposal. During the developments phases of the VE studies all designated ideas are expanded into workable solutions. The developments consist of the recommended designs, capitals and life cycles costs comparison and descriptive evaluations of the advantage and disadvantage of the proposed recommendation.

E. Report Phase

The VE consultants would work in concerts with the A-E and the PBS representatives to produces a preliminary written VE Reports which was intended for representing the result of the VE workshops activity, and meets the VE Programs objective. The post-studies portions of the VE studies include the finalizations of the VE Reports to incorporate the VE proposal developed during the workshops. The Designers then respond by accepting and incorporating the proposal in the projects designs, rejecting the proposal, or recommending further studies.

V.DATA ANALYSIS

Master format was standard to organize specification and other written data for commercials and institutional buildings project and Uniformed was a standards to classify buildings specification, costs estimating, and costs analysis in the U.S. and japan. The element is major component common most building.
Cases studies of residential buildings had taken for studying values engineering applications. In these Master format and uniformed is prepared. After preparations of master format and uniformed coming steps are to apply Pareto Law 25/85.which comes through rankings of the functions according to the cost in descending orders.

Around 25% of the function constitutes around 85% of the costs. The function (25%) is the subjects of values engineering. Weight for all criterions is assigned for reflecting relative's importance base on the projects attribute that had been verified and defined clearly.

TABLE I
FUNCTIONS OF UNIFORMAT RANKED IN DESCENDING ORDER

Code	Uniformat	Cost (Rs.)	% of the Total Cost	Accumulative Cost	% Accumulative
031	Flooring	2,90,520	15.00%	2,90,520	15.00%
043	Door & Window	2,52,520	13.04%	5,43,040	28.04%
022	Centering Work	2,23,476	11.54%	7,66,516	39.58%
051	Plastering	1,56,880	8.10%	9,23,396	47.68%
021	Slab	1,43,710	7.42%	10,67,106	55.1%
024	Beams	1,24,361	6.42%	11,91,467	61.52%
041	Painting	10,4000	5.37%	12,95,467	66.89%
061	Plumbing	1,00,000	5.16%	13,95,467	72.05%
011	Stepped Foundation	92,958	4.80%	14,88,425	76.85%
025	Brickwork	83,916	4.33%	15,72,341	81.18%
023	Column	81,386	4.20%	16,53,727	85.38%
092	Profit	76,000	4.00%	17,29,727	89.38%
081	Light and Power Distribution	75,000	3.87%	18,04,727	93.25%
042	Carpentry Work	62,600	3.23%	18,67,327	96.48%
091	General Condition & Overhead	36,906	1.90%	19,04,233	98.38%
101	Equipment	32,097	1.62	19,36,330	100%
012	Spec. foundations	0	0%	19,36,330	100%
052	Partitions	0	0%	19,36,330	100%
053	Specialties	0	0%	19,36,330	100%
06	Elevator	0	0%	19,36,330	100%
072	H.V.A.C	0	0%	19,36,330	100%
073	Fire protection	0	0%	19,36,330	100%
074	Special mechanical system	0	0%	19,36,330	100%
082	Special electrical system	0	0%	19,36,330	100%
	Total	19,36,330			

It is noticed the first 6 items (out of 16) forms 62.54% of the total costs. These mean 36.5% of the function form 62.53% of the costs which was very close to Pareto Laws. As conclusions, the areas of values engineering analysis and studies would be controlled by the first six function are listed in following table.

Code	Uniform at	Cost (Rs.)
031	Flooring	2,90,520
043	Door and Window	2,52,520
022	Cantering Work	2,23,476
051	Plastering	1,56,880
021	Slab	1,43,710
0214	Beams	1,24,361
Total		11,91,467

VI. CONCLUSIONS

Values Engineering may be applied during all stages of project's designs developments cycles. In despite of, the greatest benefits and resources savings are typical achieved early in the developments and conceptual designs stage. VE can be applied much than once during the life of the projects. Early applications of VE help for getting the projects started in the directions, and repeated applications help to filters the project's directions based on changing data. It was important available and compares qualities element of these designs with the owner's requirement. The application of Pareto Laws 25/85 state that is around 25 % of the function constitutes around 85% of these costs. The function (25%) was the subjects of values engineering. Likewise It is noticed the first 7 items (out of 17) form 62.53% of the total costs. These mean 37.6% of the function form 62.53% of the costs which was very close to Pareto Laws. As conclusions, the areas of values engineering analysis and studies would be controlled by the first seven functions. Further, he can does analysis of the function and suggests alternative and calculates costs models after applications of values engineering techniques.

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