EXPLORING CONCEPTUAL LINKAGES BETWEEN VALUE ENGINEERING AND SUSTAINABLE CONSTRUCTION

By

Ahmed Badawy Hassan

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the degree of
MASTERS OF SCIENCES
in
ARCHITECTURE ENGINEERING

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Title of Thesis: Exploring Conceptual linkages between Value Engineering and Sustainable Construction

Key words: best value, conceptual linkages, sustainable construction, value engineering

Summary:

Value Engineering is a systematic approach for achieving optimum value for money, while maintaining or improving quality, safety, reliability and maintainability. It is a problem-solving technique based on analysis of the project functions demanded by the owner in order to meet the end user's requirement and needs. VE uses multi-discipline teams to analyze a product design, an engineering concept or a construction approach. Sustainable construction is broadly created to explain the contribution of the construction industry to sustainable development. Literature suggests that the key targets for construction include: environmental impact reduction; cost minimization; social improvement; economic and cultural quality throughout the whole life of the project.

VE comprises powerful tools and techniques that can be used to adopt and diffuse sustainable construction principles amongst its team members. While concerns of sustainable construction dimensions are inherent in most VE studies, the level of consideration differs from study to another depending on the knowledge of team members. Further research is needed to establish the barriers that could impede the further integration of both subjects. More conceptual linkages must be developed, if an integrated approach to VE and sustainable construction are to emerge considering encouraging those who have the knowledge.

Acknowledgments

First of all, I am grateful to God for giving me the strength and patience to finish this thesis. Foremost, I would like to express my sincere gratitude to my advisors Prof. Dr. Emad El Sherbiny and Dr. Tarek Nasr El Din for the continuous support of my thesis study and research, for their patience, motivation, enthusiasm, and immense knowledge. Their guidance helped me in all the time of research and writing of this thesis. I could not have imagined having better advisors and mentor for my thesis study. I am totally indebted to Dr. Emad El Sherbiny for the extended precious hours he spent with me to develop the thesis.

My sincere thanks also go to my wife Arch. Rana Gamal, who supported me in the research. I owe a debt of gratitude to her.
I would also like to express my deepest gratitude to my parents and all my family.

Very special thanks to my friends Arch. Amira Shaaban, Eng. Mohamed Mahmoud and Dina Raafat for their efforts and time.

I owe special gratitude to Dar Al Handasah where I learnt a lot in, through working on great projects helped me in my thesis.

Finally, I would like to thank everybody who was important to the successful realization of thesis, as well as expressing my apology that I could not mention personally one by one. All may not be written but nothing is forgotten.

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Nomenclature

VE	value engineering
SC	sustainable construction
GNP	Gross National Construction
LCC	life cycle cost
VA	value analysis
SOW	scope of work
VECP	value engineering change proposal
WBS	work breakdown structure
LCCA	life cycle cost analysis
USGBC	U.S. Green Building Council
BREEAM	Building Research Establishment Environmental Assessment Method
LEED	Leadership in Energy and Environmental Design
CASBEE	Comprehensive Assessment System for Building Environmental Efficiency
DGNB	Duetche Gesellschaft Fur Nachhaltiges Bauen
IEA	International Energy Agency
PENREN	the Pentagon Renovation Program
EPA	Environmental Protection Agency
CFC	Chlorofluorocarbon
HCFC	Hydro chlorofluorocarbon
VOC	volatile organic compounds
PVC	polyvinyl chloride
CCA	copper chromium arsenate
PBT	persistent bio accumulative toxic chemicals
ACQ	alkaline copper and quaternary ammonium
SCS	scientific certification systems
FSC	Forest Stewardship Council
EPS	expanded polystyrene
SIP	structural insulated panels
CMU	concrete masonry wall
PDA	personal digital assistant
IAQ	indoor air quality
HVAC	heating ventilation and air-conditioning system
STC	sound transmission class
HDB	the housing of development board
TBL	triple bottom line