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Proceedings of the

Fifth International Conference on

Construction in the 21st Century

Collaboration and Integration in Engineering, Management and Technology

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Foreword

Construction is a major industry throughout the world, accounting for a sizeable proportion of most countries' Gross Domestic Product (GDP). Furthermore, the importance of the construction sector is not only related to its size but also to its role in economic development. It produces the facilities that house a wide variety of human activities, as well as the infrastructure that connects these facilities into an increasingly complex network.

Construction plays also a crucial role in Turkey's economic development accounting for well over 6 % of GDP and employing some 1.3 million people. When the direct and indirect impacts on other sectors are taken into account, the construction sector's share in the Turkish economy reaches 30%. In 2007, 10% of the "Top 225 International Contractors" announced by the leading international industry magazine "ENR - Engineering News Record" were Turkish companies. With 22 companies among the top 225, Turkey ranked third in the world after United States and China.

Within this respect; the fifth International Conference on Construction in the 21st Century (CITC-V) has a very special theme which is "***Collaboration and Integration in Engineering, Management and Technology***" and presents a global approach to the construction industry which implies that studies and implementations related to the construction sector are multi-disciplinary in nature. Collaboration and integration in engineering, management and technology is a rather complex and important challenge. It requires planning, financing, selection of appropriate construction materials/technology and management, which have to be all performed with success.

On the other hand; the statistical documentation of the CITC-V conference is as follows: More than 300 abstracts have been received. To ensure the high quality of CITC conference series, after a careful review of the Technical Committee, 215 of them are found eligible to be published in the conference proceedings. Currently 35 countries have been represented by their 180 delegates in the CITC-V conference. The future of built environment will greatly depend on the knowledge generated through education and experience. Thus, this conference will be an instrument to disseminate the high level of information provided by the authors. The proceedings of this conference will be a reference document to help maintaining the up to date information of academics and construction professionals.

Due to its strategic geographical location, Turkey is acting as a kind of natural bridge between the east and the west. We hope that, the same bridge function could also be maintained within the context of this conference and experiences gained throughout the world will disseminate to other countries, through this conference.

We would like to extend our deepest gratitude to many colleagues, associates and sponsor companies/institutions that have contributed and thus made this conference possible and successful. Also, we would like to say a sincere welcome for the participants who are here as our guests and decided to join in this important world event.

Finally, we wish all of you a very successful conference and enjoyable stay in Istanbul.

M. Talat Birgonul
Salman Azhar
Syed M. Ahmed
Irem Dikmen
Cenk Budayan

Istanbul, Turkey, May 2009

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site with a particular product (concrete materials). The demand for this product from each of the site has different capacities. This problem can be called unbalanced transportation problem. Because, demand amount and supply amount are not equal to each other. In this problem, supply center (concrete plants) can not supply the demand. The capacities of supply center are less than demand center (construction sites). Maximum production at concrete plants, the variable production cost per m3, and the transportation cost per m3 from each factory to each site are different.

In this paper, a new algorithm called Simplified Generalized Network Algorithm (SGNA) based on networks has been derived from Generalized Networks (GN) for solving sample problem. The classical solutions of the sample unbalanced transportation and SGNA solutions of same unbalanced transportation problem have obtained using analytical solution techniques. These solutions have been classified and compared with each other. The suggested new algorithm SGNA give us same solutions of other solution algorithms. This shows that SGNA is capable and useable for solving of unbalanced transportation problems mentioned construction site management.

Paper 32, Page 261-266

A Proposal for Architects' Design Performance Assessment Using Objectives Matrix

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Abstract: The overall intent of this research is to provide clients and architects with basic evaluation system that can be used to understand and improve task performance of architects so as to optimally satisfy the client's requirements and achieve high quality overall project performance. By means of 5 typical design goals, i.e. Aesthetics, Functionality, Buildability, Economics, and Environmental Sustainability a basic 'objectives matrix' is formulated to exemplify the assessment of architects' design performance. As an outcome of the study, a basic model for evaluating architects' design performance is pointed out with the potentials in the industry. It is concluded that a generally accepted evaluation system for architects will be beneficial to quantify project performance within the construction industry.

Paper 33, Page 267-274

A Conceptual Framework to Assess Architectural Design Quality by Analytic Hierarchy Process (AHP) and Its Integration to Building Contracts

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Abstract: During the last century theorists have discussed and tried to reveal characteristics of architectural design processes. Since each building design project is unique and has its own context, classification and topics of interests are about the structure of the decision making process, parallels among architectural designing, creative behaviour and problem solving. Recently there are various methodologies developed in order to support multi criteria decision making processes. Frequently refereed ones are Analytical Hierarchy Process (AHP) and Analytical Network Process (ANP). AHP is a powerful and understandable methodology that allows groups or individuals to combine qualitative and quantitative factors in decision making process. ANP methodology allows groups or individuals to deal with the interconnections (dependence and feedback) between factors of complex structure in decision making process. AHP structures a decision problem into levels forming a hierarchy, while the ANP is using a network approach (Van Bakel, 2005; Topçu, 2009).

This paper tries to put out a conceptual framework of a PhD study previously started to assess architectural design quality from the perspectives of design team, client, users, society and contractors by using AHP and its integration to building contracts. The outcomes of the paper will be used in order to develop a handy tool while deciding on appropriate building contract which architectural design quality plays an essential role.

Paper 99, Page 802-810

Quality Culture Auditing for Construction Contractors in Pakistan

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Abstract: Quality management has been one of the research focuses in construction management for at least two decades and extensive literatures have been written in areas related to the quality of construction works. Most agree that a change in culture, or a creation of a quality culture, is the key to the success of any quality initiatives made by contractors. To achieve cultural change, one must be able to measure the magnitude of any change, positive or negative, against a pre-determined benchmark. In other words, the existing quality culture of a contractor must first be audited so that it can be used for further reference. Through the use of a Quality Culture Auditing (QCA) questionnaire, this paper develops a pragmatic tool enabling construction contractors to measure the quality culture quantitatively using a scoring system. A total of 42 construction contractors completed the QCA questionnaire and the scores obtained were analyzed. The results indicate that QCA can be used to reflect the existing quality culture of a construction contractor, who can hence make improvement on the areas which are weak as indicated by the QCA.

Paper 100, Page 811-819

Quality Function Deployment Methodology for Evaluating Customer Satisfaction in Mass Housing Sector

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Abstract: Along with the concept of globalization, the competition among the world markets has become stronger and as a result, customer satisfaction has become the most important way for companies to differentiate themselves from their competitors. Thus, the companies must accurately determine the customers' needs and requirements in order to achieve perfect and permanent customer satisfaction. Supposing that the performance of a mass-housing producer could be evaluated by customer satisfaction, it is explored what percentage of the customers' needs and expectations has been concerned and adapted in accordance with today's mass housing trends. With the guidance of this evaluation, the applicability of the Quality Function Deployment (QFD) methodology to mass housing sector has been questioned and a sample model has been proposed for its adaptation to the sector. Within the context of this study, an attempt has been made to contribute to developments pertaining to the adaptation of QFD to the construction industry. For this purpose, a strategic focus group representing the potential mass housing customers has been composed and a research has been carried out with this group to collect and process data concerning their basic requirements and expectations. The finding of the study has demonstrated that the companies in the mass housing production market can considerably benefit from this methodology. As a result, despite some limitations and challenges, QFD has been observed as a very flexible and adoptable tool for mass housing producers, while evaluating the expectations of their potential customers.

Paper 101, Page 820-823

Built Quality Evaluation Case for Hotel Buildings in Turkey

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Abstract: A study of built quality evaluation in 12 quality hotels in Turkey has been carried out and the results are reported using a site survey in 2004. The breakdown of quality deficit areas showed that design mistakes and technical problems dominated on the total ratio. A number of factors that affect renovation need of hotel buildings, such as age, fashion, technical imperatives, etc., are reviewed and the difficulties in assessing hotel building quality performance are pointed. Finally the problem areas of built quality, and reasons for renovation are presented as an outcome of the research.

Paper 102, Page 824-831

Socio-Economic Influences on the Adoption of Total Quality Management in the Libyan Construction Industry

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Abstract: The Libyan construction industry has evolved significantly in recent years and this paper sets out to explore the socio-economic influences that may present barriers to the wider adoption of quality management practices in the Libyan construction industry. Building on established paradigms of Total Quality Management (TQM) and empirical evidence from a survey of two Libyan construction companies, this paper presents a quantitative measure of TQM practice within the Libyan construction sector and outlines proposals to enhance future practice. The outcomes from this research are threefold. The first is a conceptual model for TQM that draws together threads of academic theory into a unified framework for analysis and which will be of interest to academics and researchers. The second is an assessment of TQM knowledge and understanding within the construction sector of Libya, which international businesses with an interest in engaging with the construction process in Libya will find of significant value. Thirdly the paper identifies socio-economic influences that have acted to help or hinder the adoption of TQM practices within the Libyan construction industry and proposes ways of addressing the issues raised.

Paper 103, Page 832-839

Investigating the Cost of Quality in Construction SMEs

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Abstract: This paper is based upon empirical research conducted within the UK SME construction sector. It appertains to an investigation into the perception of quality and how it can be realistically costed by UK SME construction organisations. It is important to be able to quantify the true costs of a 'quality driven agenda', as this can have a bearing upon the strategy an organisation adopts in relation to the quality issue. Part of the empirical research was based upon a case study, supported by questionnaires sent to a sample selected from UK construction companies and incorporating interviews. One also needs to be able to differentiate between 'quality costs' at the design and construction phases, this aspect forms part of the study. The conclusions drawn will have valid transferability for SME construction companies in the wider European context, as the basic principles of costing are the same. The proposed outcome of the paper is to provide a valid rationale for the attainment of quality costs and further to provide a suitable evaluative model for utilisation by other European construction companies.

2.6 Legal and Contractual Issues

Paper 104, Page 840-850

A Study on Malaysian Legal Framework and Risk Management: Design Works

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Abstract: The construction industry is subject to more risk and uncertainty than many other