

**Department of Building  
School of Design and Environment**

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**CME RESEARCH STUDENTS' FORUM**

**Date: Wednesday 17 Sep 2003**

**Venue: Executive Room 4**

**Time: 2.00 to 5.00 pm**

**Convenor:  
Assoc Prof Willie Tan**

**Presentations by:**

	<u><b>Name</b></u>	<u><b>Title</b></u>
1.	<b>Lim Jay Na</b>	<b>A National Approach to Stimulation of Construction Innovation in Singapore</b>
2.	<b>Himal Suranga Jayasena</b>	<b>Impact of Mobilisation Advance Payment Clause on Key Project Stakeholders</b>
3.	<b>Jin Xiaohua</b>	<b>A Trust-based Partnering Model for Construction Projects</b>
4.	<b>Koh Tas Yong</b>	<b>Organisational Culture and Construction TQM Practices</b>
5.	<b>Harikrishna Narasimha</b>	<b>Life-Cycle Cost Design of Concrete Structures</b>
6.	<b>Lawrence Lesly Ekanayake</b>	<b>Improving Environmental Impact Assessment (EIA) and Approval Process</b>

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**Abstracts**

**1. A National Approach to Stimulation of Construction Innovation in Singapore**

This paper examines the national approach to the stimulation of innovation in construction. Based on Porter's Diamond concept and Stern et al's notion of national innovative capacity, a generic model for a national approach to stimulating innovation in construction is developed. This model, established by the hypothesis that the rate of construction innovation is a specific function of the national determinants of: Factor Conditions, Demand Conditions, Related and Supporting Industries; Firm Structure, Strategy and Rivalry; Government; and Institutions, encompasses a set of indicators that measure the significance of each national determinant. The model is further applied to five countries: Singapore, Korea, Japan, United Kingdom, and the United States; to identify key national determinants and stimulants of innovation in construction. Key statistical data for the model are acquired from reputable organisations, such as OECD and A-star, which are based on internationally established and documented methodologies. This study then proposes a more systematic application of national capabilities, resources and regulatory policies in stimulating innovation in Singapore's construction industry.

**2. Impact of Mobilisation Advance Payment Clause on Key Project Stakeholders**

Even though it is common for some contract forms (FIDIC, NEC, etc.) to allow the option for the employer to make advance payment, the Sri Lankan form of contract (ICTAD) includes an obligatory condition (clause) of Mobilisation Advance Payment (MAP) which equals to 20% of the contract sum. The purpose of this study is to examine its impact on key stakeholders. This study is interesting because the effects of such clauses and responses differ in different contexts. The study aims at identifying why MAP was introduced and what its impacts are in the Sri Lankan context. The hypothesis is that affected stakeholders will find ways to overcome this constraint and such ways may or may not be beneficial to the construction industry as a whole, and the responses may vary across firms because of differing abilities such as to raise project finance and cushion the impact of unstable cash flows. The research

methodology is based on a survey of 100 key stakeholders using interviews and questionnaires. The data are expected to be analysed comparatively across firms.

### **3. A Trust-based Partnering Model for Construction Projects**

This study designed and tested a model for implementing trust-based construction partnering. The model considers four distinct relational forms that exist during the construction process: shallow dependence, deep dependence, shallow interdependence, and deep interdependence. In various types of relational forms, the model identifies the trusts that exist, viz. deterrence-based trust, calculus-based trust, relational trust, and institutional trust. The model also considers different risks which are inherent in certain relationships in partnering context. The research design to test the model was based on a questionnaire and two case studies. Data were collected by postal surveys in Singapore and China, and face-to-face interviews. The results show that the model accurately reflects the trust and relationship issues in construction partnering. The study also addresses the critical measures which are needed for building trusts and securing successful partnering.

### **4. Organisational Culture and Construction TQM Practices**

With the advent and adoption of ISO9001:2000 by construction companies, it is opportune to 'take stock' of current quality management practices adopted by construction companies as the new ISO Standard is considered to be able to prepare companies towards Total Quality Management (TQM). As the adoption of TQM is related to a company's culture, this study investigates, from an organisational culture point of view, the correlation between cultural orientation and the adoption of TQM practices among local construction companies certified to ISO9001:2000. The Competing Value Framework (CVF) is used to assess organisational culture and 8 TQM elements have been identified from the literature to gauge the adoption of TQM practices among local construction companies. A total of 145 medium to large local construction companies (BCA Registry grade A1, A2, B1 and B2) have been identified to be included in the sample frame. Survey questionnaires have been administered to solicit their responses.

### **5. Life-Cycle Cost Design of Concrete Structures**

In translating their design concepts into member proportions and structural details, engineers use numerical methods to provide adequate strength, stability and serviceability to the final structure. The skill comes in providing this adequacy at the least cost—usually taken to be the first cost or the cost of construction. Such a traditional approach to structural design tends to focus only on the initial cost of structural design and construction. A major drawback of this approach is that there is no consideration given to the future costs that will accrue throughout the life of the structure. Future costs include energy, operating and maintenance costs, repair/refurbishment costs and damage/failure costs and can form a substantial part of the total cost to be incurred by the user(s) during the entire lifetime of the structure. The experience gained with concrete, especially reinforced concrete, is that it is not maintenance-free and degrades with time. Keeping this in mind, a more pragmatic and efficient approach towards structural design would therefore be to a) develop a framework that provides economic insight into the various components of cost (initial as well as future) incurred during the life of a structure and b) incorporate this information in the actual design process with the overall objective of achieving overall-cost effective design without compromising on the requirements for structural strength, performance and reliability.

This study focuses on evolving a design approach based on life-cycle cost considerations that can be adopted for a structure during its design stage. Such an approach accounts for the performance of a structure over its entire lifetime. The methodology focuses on the identification of the major causes and critical locations of structural deterioration that affect structural condition and performance and consequently the timing and magnitude of future costs. Tradeoffs between initial costs and future costs are examined. All these considerations are encapsulated into a model that enables integration of life-cycle cost considerations with the structural design process.

### **6. Improving Environmental Impact Assessment (EIA) and Approval Process**

After The Brundtland Report (1987), Rio declaration (1992) and Kyoto Convention (1997), all the nations reemphasized their commitment to environmental protection. Environmental Assessment systems have been established in various forms throughout the world. The developments may have wide-ranging, long-term and often very significant impacts on the environment. However, subjective perceptions of impacts may significantly influence the responses and decisions of people towards a proposed development. An EIA is intended to ascertain the environmental costs (and benefits). The projected results carry a certain level of uncertainty since almost all are estimated. Under this context affected parties are likely to envisage the uncertainty of the EIA process and predictions, especially when they

perceive negative impacts. The early proactive role of the courts greatly strengthened the power of environmental movements and caused many projects to be abandoned or substantially amended. In many cases the lawsuits delayed construction for long enough to make them no longer economically feasible.

This study highlights the weak points of the current EIA process in Sri Lanka and proposes a theoretical framework to stimulate the process towards an effective arena. This will eliminate possibilities for post-approval disputes and litigation issues against the development project. The theoretical framework will be validated by using two case studies from Sri Lanka. Questionnaires and both structured and unstructured interviews will be used.